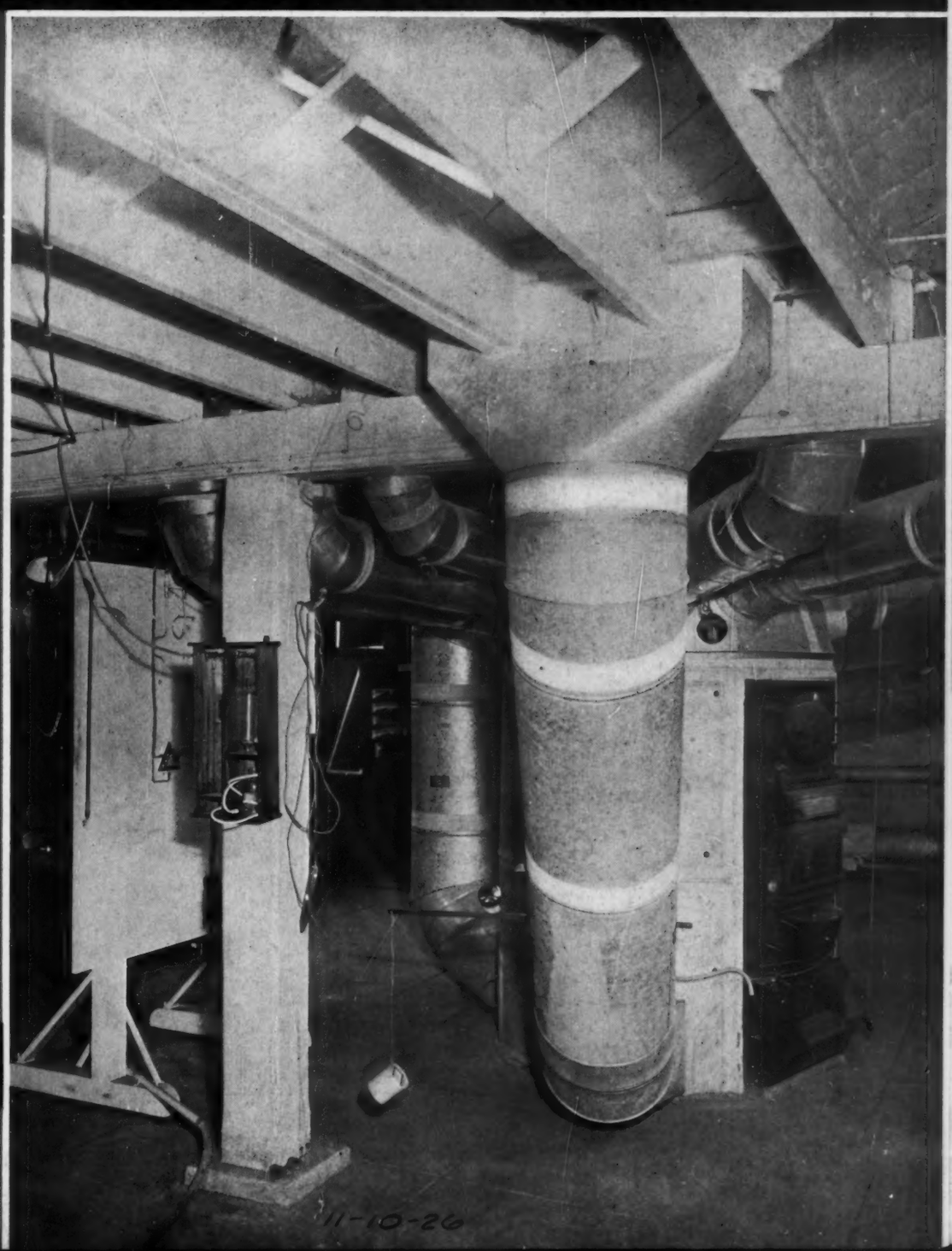
AMERICAN ARTISAN

WARM AIR HEATING • AIR CONDITIONING
SHEET METAL CONTRACTING

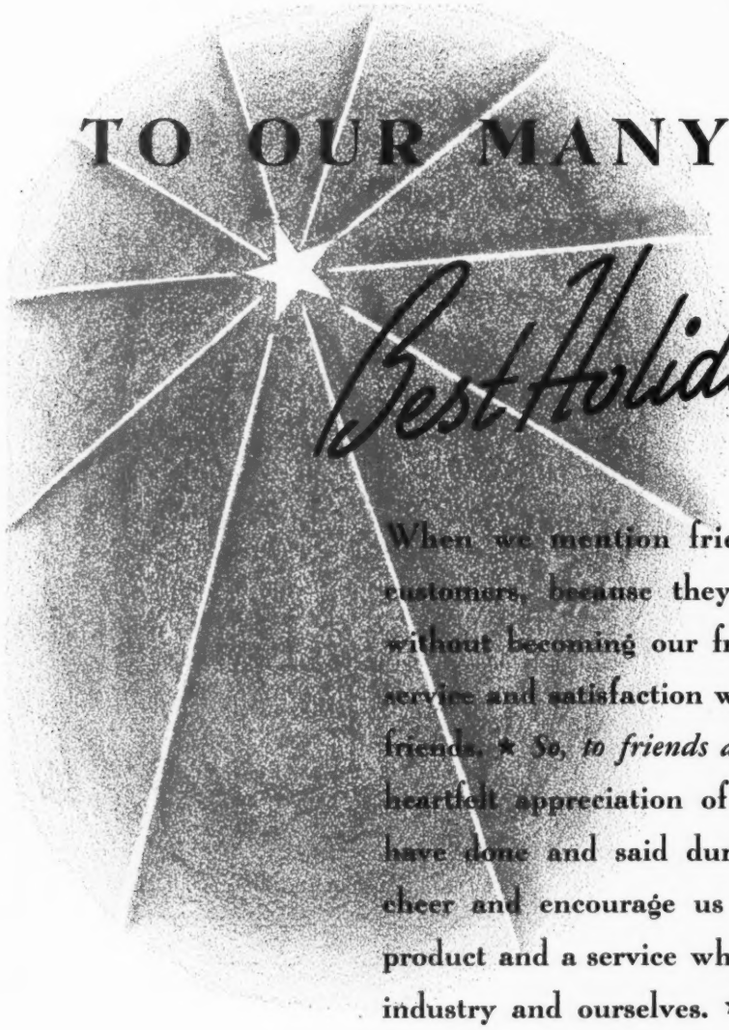


AIR CONDITIONING SECTION

PAGE 35

ESTABLISHED 1880

DECEMBER 1938



TO OUR MANY FRIENDS

Best Holiday Greetings

When we mention friends we naturally include customers, because they cannot be our customers without becoming our friends. Our policy of giving service and satisfaction which *keeps* customers, *makes* friends. ★ *So, to friends all*—we want to express our heartfelt appreciation of the many fine things you have done and said during the past year to help, cheer and encourage us in our efforts to develop a product and a service which would be a credit to the industry and ourselves. ★ As a mark of this appreciation we pause to take time out—in the stress and strain of today's many pressing duties—to wish you and yours the *most* that the Holiday season can give you in Joy, and the *best* that the coming New Year can provide in Happiness, Health and Prosperity.

SINCERELY,

Earl S. Miller

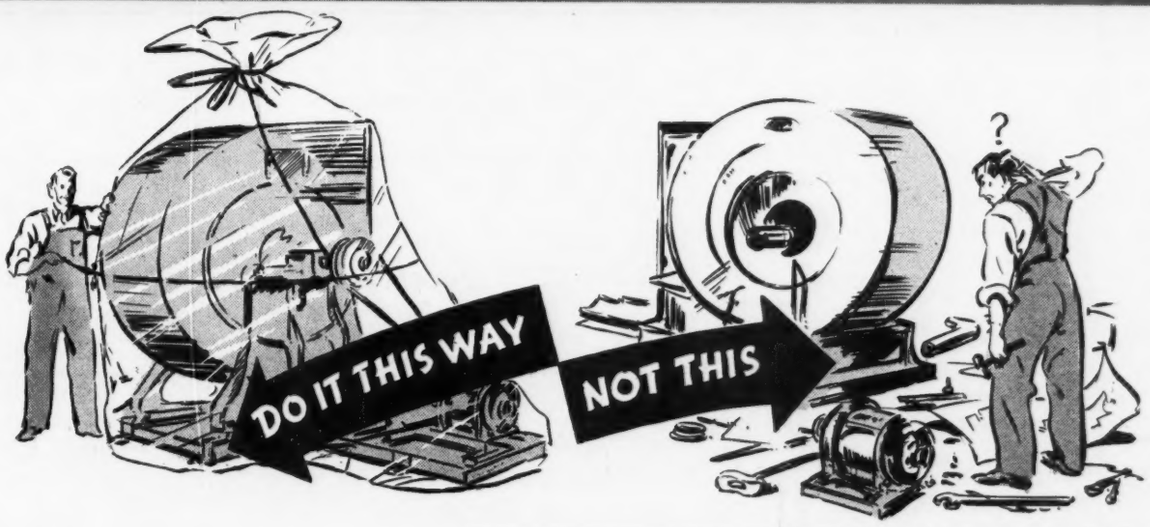
PRESIDENT

LAMNECK PRODUCTS, INC.

414 DUBLIN AVE. ★ COLUMBUS, OHIO

PREFABRICATED DUCT AND FITTINGS FOR ALL TYPES OF WARM AIR HEATING AND AIR CONDITIONING SYSTEMS

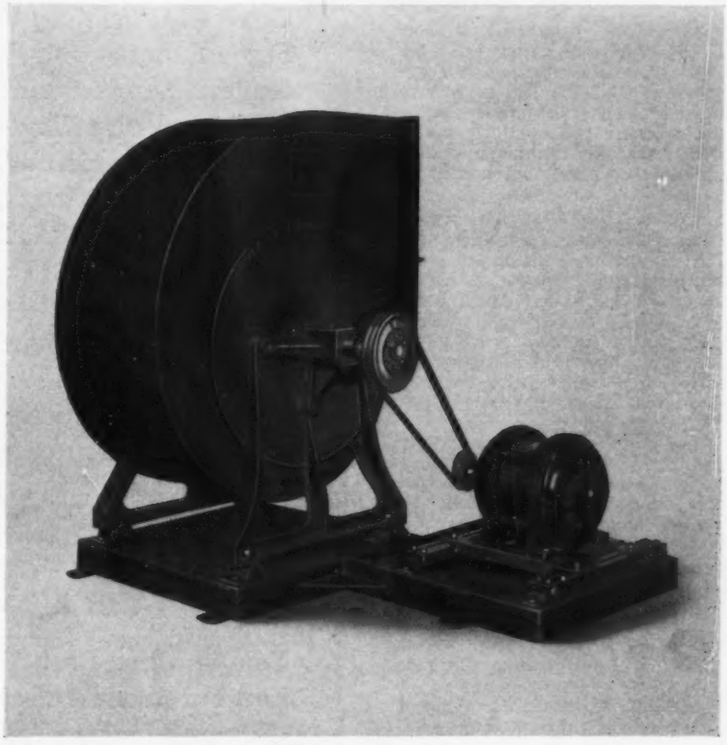
SAVE LAYOUT AND ERECTION EXPENSE ON YOUR FAN INSTALLATIONS



● Why spend needless hours on layout and erection, trying to make a quiet installation with an assortment of base parts. You can be SURE of noiseless operation by installing Buffalo Limit-Load Fans complete with motor and Silent Floating Base.

These fully assembled and tested units eliminate guesswork and trial and error methods. They operate at high efficiency and cannot overload the motors. Last, but not least, they assure complete customer satisfaction and a good profit on your contract.

Why not write today for detailed information on these complete, silent, ready-to-install units?



BUFFALO FORGE COMPANY

497 BROADWAY
BUFFALO, N. Y.

BRANCH ENGINEERING OFFICES IN PRINCIPAL CITIES

In Canada: Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

"Buffalo" Limit-Load REG. U.S. PAT. OFF. FANS

Complete with Motor and Silent Floating Base

In This Issue

IN recognition of the tremendous influence of the research data developed in the Research Residence (which the meeting this month in Cincinnati will commemorate) we use as a cover illustration, a picture of a gravity furnace installation used in 1926 in the Research Residence. From investigations in gravity operation the research led into mechanical circulation and many other fields. A new book, "Forced Air Heating," will be announced at this year's meeting.

★

Architectural applications of sheet metal work, of any importance, have been few and far between these last few years. On page 18 we describe an interesting spandrel job recently completed in Wisconsin.

★

From time to time during the last two years we have given space to discussions of warm air heating application to agricultural needs. On page 20 we wet our toes in tobacco drying, a field just opening up to furnace dealers.

★

A great many sheet metal shops do a variety of industrial work. One active field is fume removal. On page 24 is an article describing a system which removes fumes and recovers a solvent by means of an ingenious exchanger built of materials common to the average shop.

★

Probably most contractors feel that they know all about sizing and installing drainage systems on houses. However, considerable poor work has been reported lately, due, perhaps, to sloppy thinking. James McCawley, on page 26, presents some drainage fundamentals.

★

That pre-fabricated houses can and have been delivered piecemeal, or by truck is common knowledge, but a house which was "sailed" to its permanent location is something out of the ordinary. See page 30 for a new wrinkle in house delivery.

★

Temperature drop is a subject many of us have been talking about. B. L. Schwartz, a pioneer forced air heating engineer in Pittsburgh, delves into the mathematics of the question on page 37.

★

From time to time strange tales have been related of heating practices on the west coast where, in reality, some unusual and far reaching developments have been worked out. Some causes for ingenious systems are presented in the article on page 40, covering a variety of jobs.

AMERICAN ARTISAN

With which is merged

FURNACES and SHEET METALS AND Warm-Air Heating

Covering All Activities in

Gravity Warm Air Heating — Forced Warm Air Heating
Sheet Metal Contracting — Ventilating
Air Conditioning

J. D. Wilder, Editor — A. A. Kennedy, Assistant Editor

Vol. 107, No. 12 — December, 1938 — Founded 1880

CONTENTS

25 Years of Cooperation; 20 Years of Research 17
Spandrel Ornamentation 18
Tobacco Drying Barns and Cabinets 20
Covers for Printing Press Ink Rolls 22
Fume Exhaust and Exchanger for a Solvent Tank 24
Gutters, Leaders and Drainage 26
Radiator Valve Covers 28
The Problem Corner 29
A Steel House Goes to Sea 30
Welding Tantalum Sheets 31
Installment Credit Problems 32
The 1938 Editorial Index 59
Salem, Oregon, Heating Ordinance 63
New Products 65
Association Activities 70
With the Manufacturers 78
News Items 84
New Literature 88

THE AIR CONDITIONING SECTION

Temperature Drop 37
Fan-Furnace Heating in Central California 40
Chimney Liners 44
Heat Conservation in Gas Heated Buildings 46
There Is No Substitute for "Cold Canvassing" 50
Patterns for Rectangular to Round Transition 52
Comparative Cost of Oil and Anthracite 54
Routine for Checking Oil Burner Jobs 55

Member of Audit Bureau of Circulations—Member Associated Business Papers, Inc.

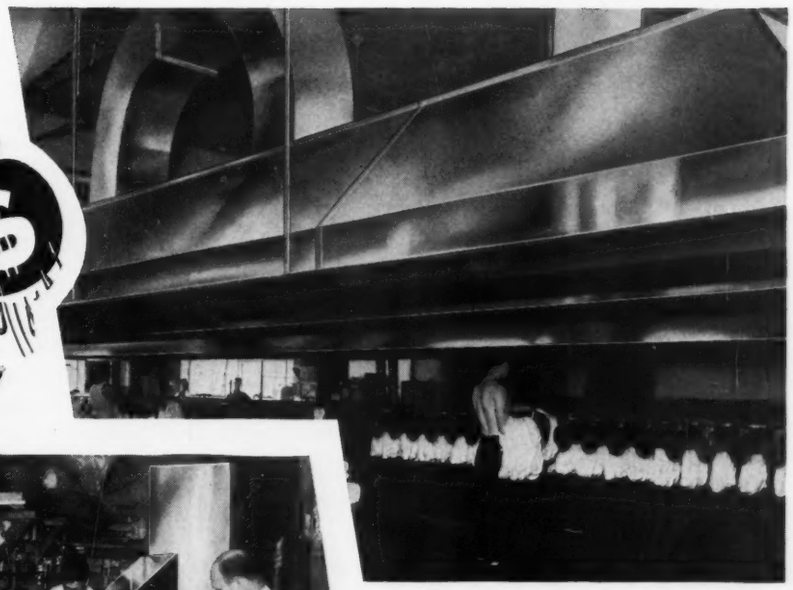
Published monthly by Keeney Publishing Company, 6 North Michigan Ave., Chicago. Branch Offices—In New York, Room 1734, Grand Central Terminal Building, Murray Hill 2-8293; In Cleveland, 2128 Rossmoor Road, Cleveland Heights, Yellowstone 1540; In Los Angeles, J. H. Tinkham, 1406 S. Grand Ave., Richmond 6191.

Copyright 1938 by Keeney Publishing Company—F. P. Keeney, President; W. J. Osborn, Vice President; R. Payne Wettstein, Secretary; Chas. E. Price, Treasurer. Advertising staff: Wallace J. Osborn, R. Payne Wettstein, Robert A. Jack, J. H. Tinkham, L. A. Doyle.

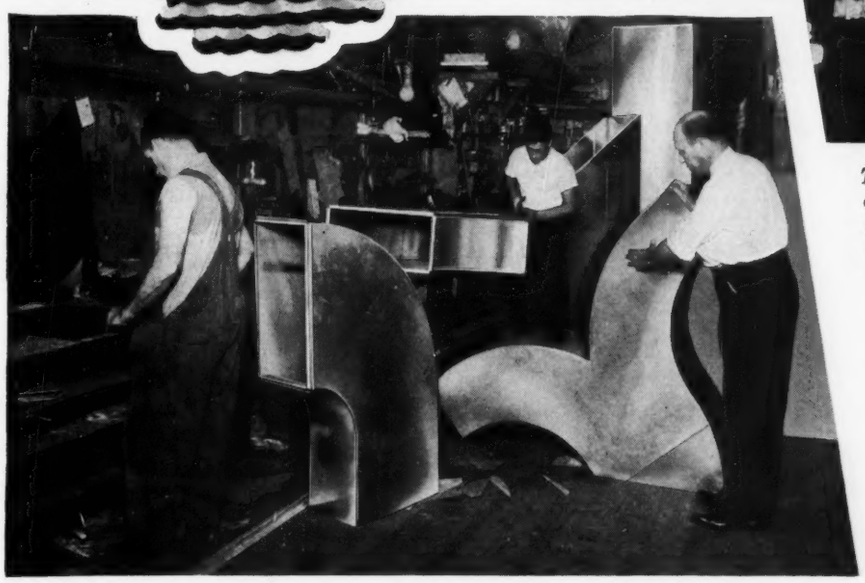
Yearly Subscription Price—U. S. and possessions, Canada, Mexico, South America, Central America, $2.00; Foreign, $4.00. Single copies, U. S. and possessions, $.25. Back numbers, $.50. January, 1938, Directory issue, $1.00 per copy. Entered as second-class matter, July 29, 1932, at the post office at Chicago, Illinois, under the act of March 3, 1879.

More than 8,000 Copies of this Issue are being distributed

LAND BIG-MONEY JOBS ...by SELLING MONEL



These Monel hoods and ducts in the plant of Malina and Co., New York, N. Y. replaced galvanized iron which failed because of rust and corrosion. The completed job takes about 5 tons of Monel sheet.



Monel fume ducts in process of fabrication at the plant of Benj. Low, sheet metal contractor, 523 E. 13th St., New York, N. Y. They are constructed of .021 and .031 gauge Monel sheet, lock seamed and soft soldered.

This ONE dyehouse job alone uses FIVE TONS of Monel sheet

What a sweet job for any sheet metal contractor! These hoods and ducts, when completed, take *five tons* of Monel sheet.

Are you landing jobs like this? You can. By building a reputation for working in Monel, you can land jobs like this... plus scores of other jobs that are smaller yet just as profitable.

What's the *secret* in landing this class of work? The secret is this. Whenever you stop in at a dyehouse or textile plant remember *two simple things:*

1. Rusty equipment in a dye room means spoiled goods . . . *lost profits* for the owner.
2. Monel for such equipment means the end of rust . . . *permanently* because Monel cannot rust.

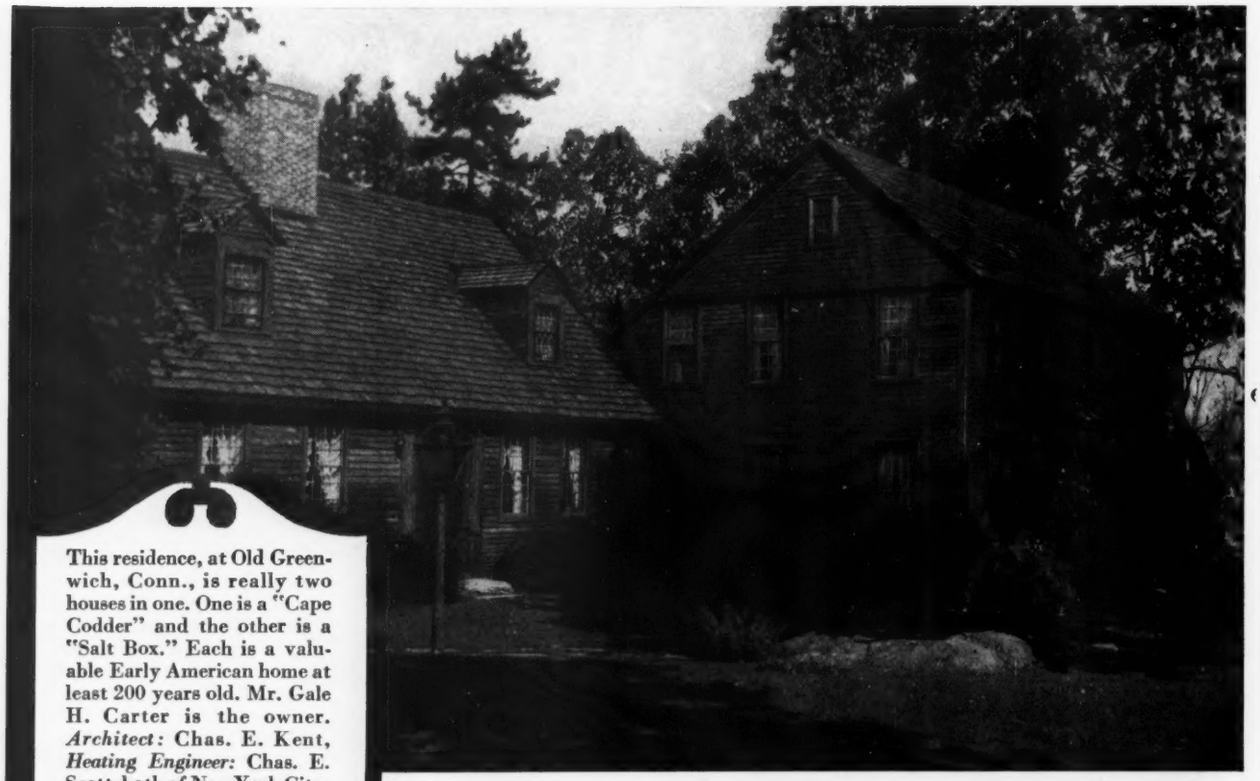
So here's your chance: Dyehouse operators and textile plant executives know that it *pays* to replace rusting equipment. *Tell them you handle Monel . . . and suggest this rust-proof, corrosion-resistant metal for vats, tanks, tank linings, buckets, pans and other utensils.*

All of this equipment, and numerous other items, offer you an opportunity to *sell your work.*

Tough, strong and durable as Monel is, it can readily be fabricated by all of the usual methods, including welding. Write for further information and complete working instructions. Address:

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street New York, N. Y.

"Monel" is a registered trade-mark of The International Nickel Company, Inc., which is applied to a nickel alloy containing approximately two-thirds nickel and one-third copper.



This residence, at Old Greenwich, Conn., is really two houses in one. One is a "Cape Codder" and the other is a "Salt Box." Each is a valuable Early American home at least 200 years old. Mr. Gale H. Carter is the owner. *Architect:* Chas. E. Kent, *Heating Engineer:* Chas. E. Scott, both of New York City.

Air conditioning is supplied by a "split" system, with approved Anthracite water-tube steel boiler and approved Anthracite stoker.

20TH CENTURY HEAT *in an* 18th CENTURY HOUSE

● Mr. Carter searched all New England for perfect examples of 18th Century American homes. He found not one, but two—bought them, transported them from their original sites to Old Greenwich, Connecticut, where they were re-erected as an harmonious residence. These rare and valuable examples of fine architecture deserved the best, safest, and most dependable heat. Mr. Carter states why he chose Anthracite:

> "I desired air conditioning to protect the rare old panelling and my antique furniture. I selected Anthracite as fuel because it is clean. I rejected oil because I don't like the dirtiness of oil smoke. It forms a film on the furniture, and furthermore, gets on the leaves of my old trees. Now that Anthracite can be handled conveniently and economically, it is much to be preferred."

When planning heating systems for new homes or modernizing existing plants, keep in mind that there are 7 reasons why Anthracite was selected as the fuel to heat this valuable, matchless architectural gem. With the whole field of heating fuels from which to select, the owner of this "perfect home" chose Anthracite. With Anthracite as with no other fuel, the heating contractor can provide his customers with all 7 essentials of heating comfort. The wide variety of modern Anthracite equipment is described in a book which we will be glad to mail upon request. Anthracite Industries, Inc., Chrysler Building, New York.

●

This Seal of Approval appears on Anthracite equipment only after it has passed the most rigid tests in the heating field.

ANTHRACITE INDUSTRIES INCORPORATED approved

Save with Pennsylvania ANTHRACITE (HARD COAL)

THE ONLY 7 STAR FUEL

FIBERGLAS*...

an amazing product that may cut costs in your business!

Now being made by a new company—OWENS-CORNING FIBERGLAS CORPORATION—formed by Owens-Illinois and Corning

FIBERGLAS*—*pure glass in new forms for new uses* —has been proved successful in many practical commercial applications.

IN INDUSTRIES like building, electrical and industrial insulation . . . refrigeration . . . air conditioning . . . it has brought about important product improvements or actual savings in cost.

These advantages will give you the reason why:

1. FIBERGLAS is inorganic.
2. It is not subject to attack by acids (except hydrofluoric acid) corrosive vapors or moisture.
3. In application, it is light in weight.
4. It is an outstanding insulator and it is both fireproof and heat resistant.

THE FIELD OF POSSIBLE APPLICATIONS for FIBERGLAS has hardly been tapped. For it is essentially a *new basic material* which—because of its superior qualities—has potential advantages for nearly *every* industry.

New Company Formed For Manufacture and Research

A new company, OWENS-CORNING FIBERGLAS CORPORATION, has been formed jointly by Owens-Illinois Glass Company and Corning Glass Works . . . to carry on the manufacture of FIBERGLAS for its proved-successful applications . . . and to extend still further its development and field of usefulness.

Find Out If FIBERGLAS Can Improve Your Product . . . Save You Money!

In your own business, FIBERGLAS may have an application that will improve your product or process . . . give you new economies in design and construction.

It has done so in other industries. And it may be that—for *your* industry—FIBERGLAS is *already* available in a form to fit your specific problems. An inquiry will bring to your desk complete information on FIBERGLAS and its present industrial applications. *T. M. REG. U. S. PAT. OFF.

For information or consultation, write to

OWENS-CORNING FIBERGLAS CORPORATION
TOLEDO, OHIO

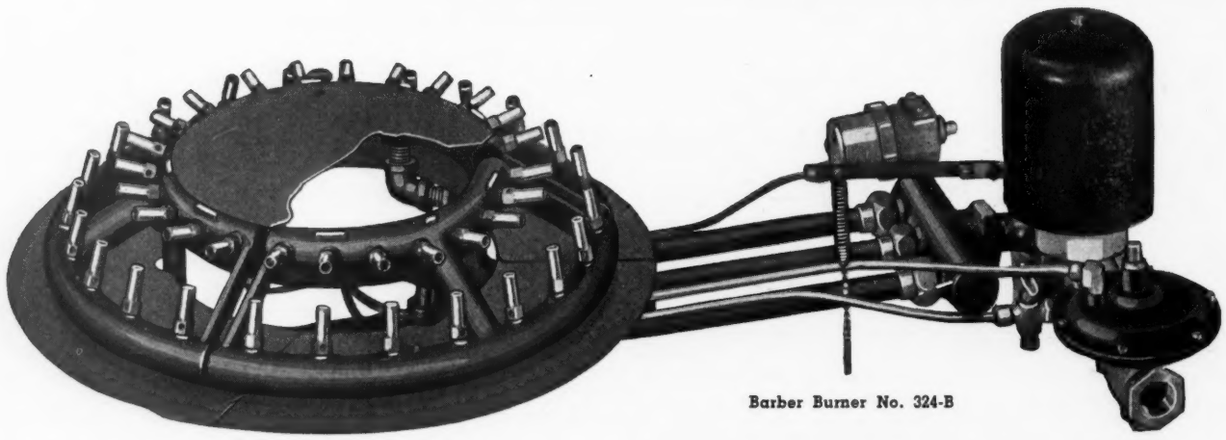
Factories in NEWARK, OHIO, AND CORNING, N. Y.

Sales offices in NEW YORK, BOSTON, WASHINGTON, CHICAGO, DETROIT, PITTSBURGH, CINCINNATI AND LOS ANGELES

RESEARCH LABORATORIES IN NEWARK, OHIO

COPYRIGHT, 1938 OWENS-CORNING FIBERGLAS CORP.

Every Dealer *and* Distributor *of* BARBER *Burners* *has a big* SALES ADVANTAGE!



Barber Burner No. 324-B

Because it has the OUTSTANDING Gas Conversion Burner—Barber offers its sales outlets a BETTER SALES STORY! A twenty-year performance record on thousands of installations makes Barber Burners distinctly easier to SELL—more certain to STAY SOLD.

It is part of Barber's service to the trade to furnish sales guidance and assistance, as well as printed matter for use to the consumer. We particularly suggest that you shape your sales approach to the heating needs and desires of the modern American housewife. Let us help you build burner business! Write for details!

The "B" Model shown comes in 8 sizes for round grates 12" to 34" in diameter. There is also a wide range of sizes for oblong grates. Both round and oblong Barber Burners now adjustable ON THE JOB for all grate sizes. Patented BARBER Jets insure complete combustion, with a "scrubbing" flame action on walls of firebox. No fire brick or refractory elements needed. Baltimore Safety Pilot. Listed in A. G. A. Directory of Approved Appliances.

Ask for Catalog and Price List on Conversion Burners for Furnaces and Boilers, Burner Units for Gas Appliances, and Gas Pressure Regulators.

THE BARBER GAS BURNER COMPANY

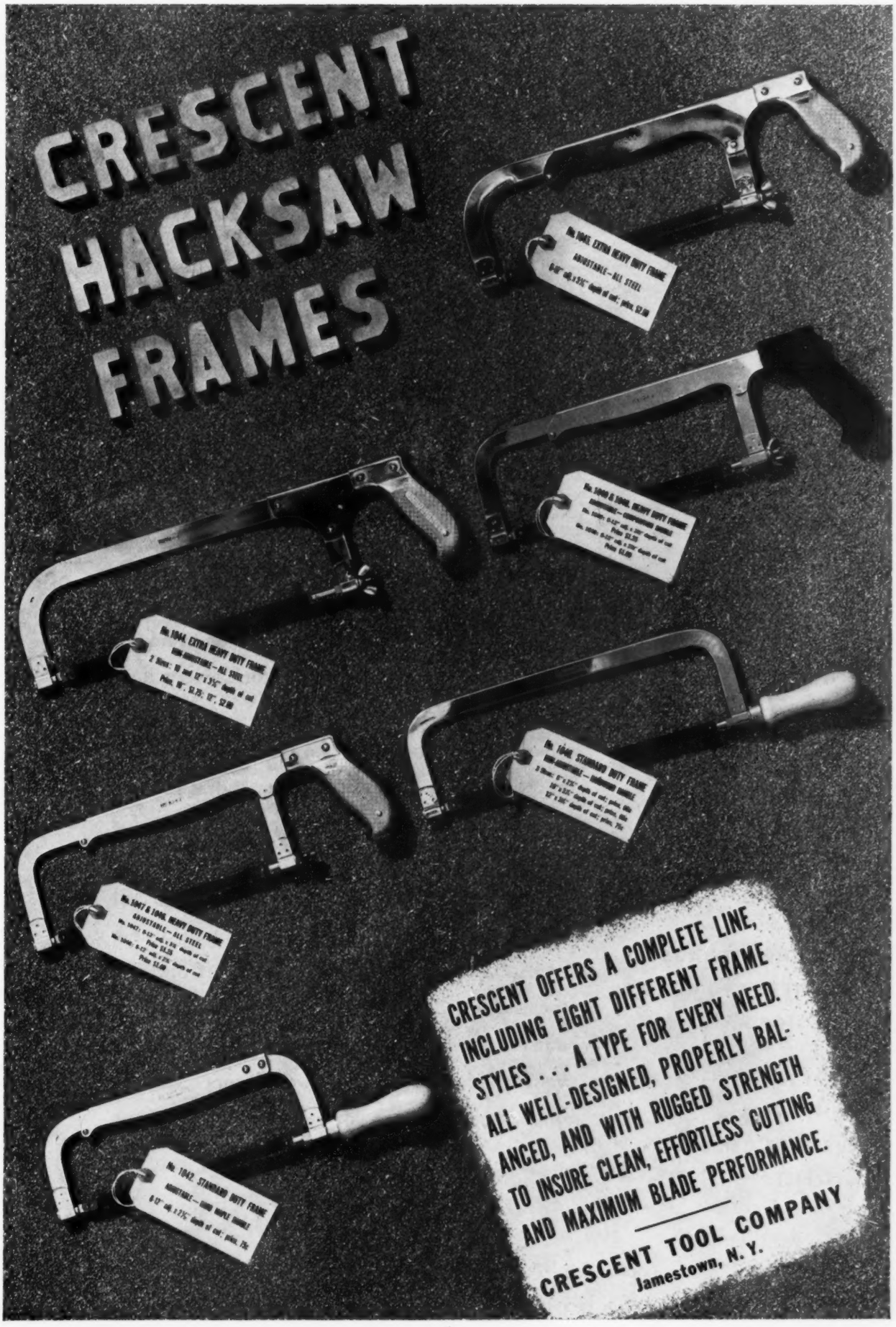
3704 Superior Avenue
Cleveland, Ohio

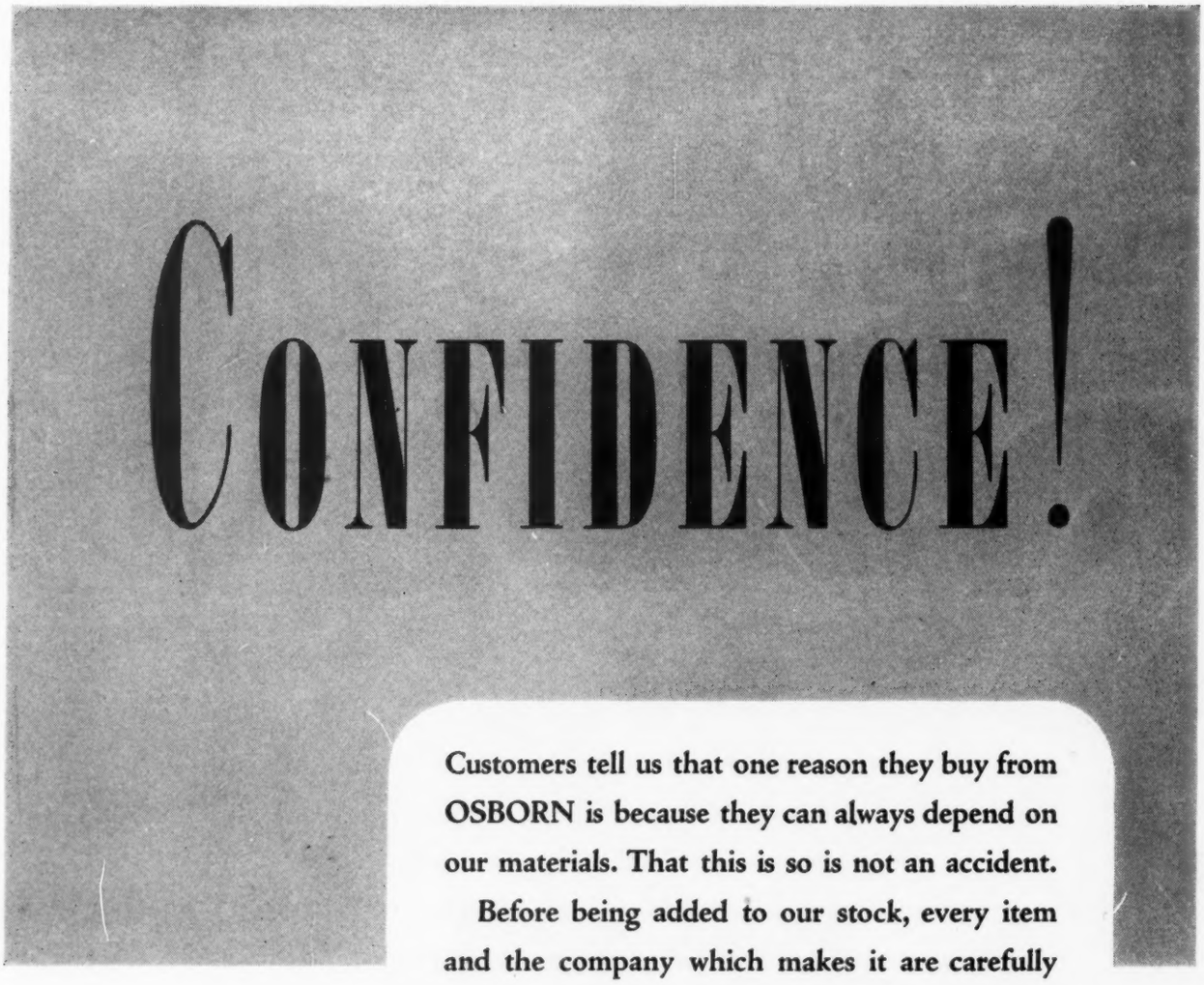
Address Michigan Inquiries to
The Barber Gas Burner Company of Michigan
4475 Cass Ave., Detroit, Michigan

BARBER BURNERS AND REGULATORS ARE DESIGNED FOR

Air Conditioning Equipment • High Pressure Boilers (Tubular and Tubeless) • Bakery Ovens • Doughnut Kettles • Metal Pots • Garage Heaters • Coffee Urns • Hair Dryers • Space Heaters • Floor Furnaces • Clothes Dryers • Water Heaters • Confectioners' Stoves • Vulcanizing Machines • Pressing Machine Boilers • Japanning Ovens • Core Ovens • Banana Room Heaters and many other Appliances.

BARBER *Automatic* JET GAS BURNERS


CRESCENT
HACKSAW
FRAMES
CRESCENT OFFERS A COMPLETE LINE, INCLUDING EIGHT DIFFERENT FRAME STYLES . . . A TYPE FOR EVERY NEED. ALL WELL-DESIGNED, PROPERLY BALANCED, AND WITH RUGGED STRENGTH TO INSURE CLEAN, EFFORTLESS CUTTING AND MAXIMUM BLADE PERFORMANCE.
CRESCENT TOOL COMPANY
Jamestown, N. Y.



Customers tell us that one reason they buy from OSBORN is because they can always depend on our materials. That this is so is not an accident.

Before being added to our stock, every item and the company which makes it are carefully investigated. This requires a lot of time—sometimes a year or more. But, in the end, it pays to be sure and saves a great deal of trouble for everybody concerned.

OSBORN, in several cases, has purchased materials from the same maker for well over a quarter of a century. In turn, many of our customers have done the same from us. If you, like ourselves, want to have absolute confidence in your source of supply, we would appreciate the opportunity to serve you.

WARM AIR HEATING

- FURNACES
- CONTROLS
- BLOWERS
- PIPE AND FITTINGS
- REGISTERS AND GRILLES
- ASBESTOS PAPER AND MILL BOARD
- DAMPERS
- HUMIDIFIERS
- FURNACE CEMENT
- AIR FILTERS

THE J. M. & L. A.
OSBORN Co
Manufacturers—Distributors
BUFFALO · CLEVELAND · DETROIT

A DEPENDABLE SOURCE OF SUPPLY FOR 79 YEARS

Zoning MAKES WARM AIR JOBS REALLY FLEXIBLE

● The small additional cost of zoning a forced warm air job need hardly be considered even under rigid economy, but its advantages are worth consideration in giving that type of heating installation a flexibility and a measure of comfort not otherwise attainable. The key to zoning is the "Genuine Detroit" No. 431 Duct Damper Motor.

Using this equipment, zoning offers four important advantages:

1. Assures even temperatures when desired in all sections of a rambling building or one subjected to unfavorable exposure conditions.
2. Eliminates the variation in indoor temperature normally caused by sudden changes in wind velocity and direction.
3. Makes it possible to hold different stipulated temperatures in different sections of a building.
4. Increases fuel economy through selective temperature standards.

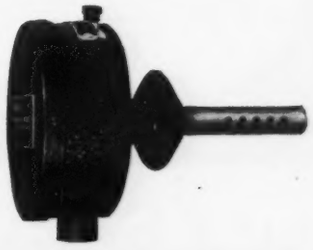
The action of the "Genuine Detroit" No. 431 is entirely automatic, the entire heating system responding to two or more room thermostats, one for each zone. The action of this control is perfectly silent and dependable. Its quietness permits applications directly to the duct—no pivots, shafts or bearings that require servicing or oiling.

You can get further information by writing for Bulletin 66.

No. 431 Duct Damper Motor showing damper shaft linkage, bearing and combination mounting bracket and damper shaft bearing.

No. 211-CH Thermostat and No. 197 Humidistat. Thermostat (compensated type) operates Duct Damper Motor which in turn controls automatic burner.

No. 197 Humidistat uses sensitive Friez type hair element and matches the Thermostat with its unusually pleasing design.



No. 244 Fan Switch limits blower operation to prevent circulation of cold air. Can be adjusted to permit blower operation in summer.

DETROIT LUBRICATOR COMPANY

DETROIT, MICHIGAN, U. S. A. • 5900 TRUMBULL AVE.

NEW YORK, N. Y.—40 WEST 40th ST. • CHICAGO, ILL.—816 S. Michigan Ave.

DIVISION OF AMERICAN RADIATOR & STANDARD SANITARY CORPORATION

Canadian Representative—RAILWAY AND ENGINEERING SPECIALTIES LIMITED, Montreal, Toronto, Winnipeg

Double Value for a "*Copper*"

. . . and a little copper doubles the value of steel

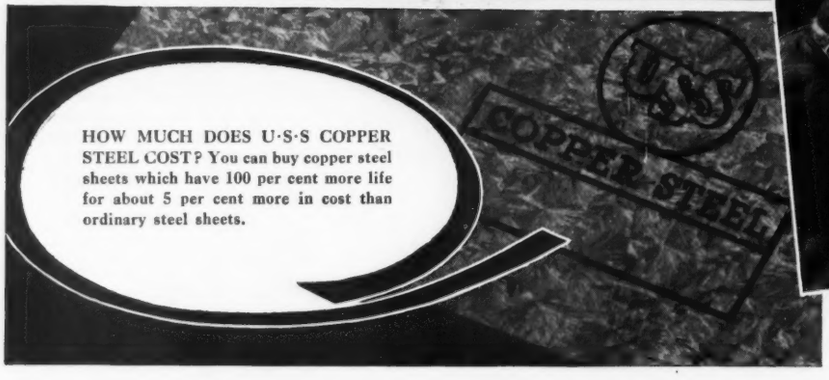
ONE cent sales have been remarkably successful because they give double value. Any customer can see that twice the amount of a product lasts twice as long.

In the steel industry, it is a "One cent sale" every time you buy U·S·S Copper Steel—for copper steel lasts more than twice as long as plain steel, yet it costs but little more.

When a product must be protected against rust at low cost, build it of U·S·S Copper Steel. For heating and air conditioning systems and equipment, this metal has proven to be the best obtainable. It not only lasts longer but it keeps fabrication costs down.

U·S·S Copper Steel is easy to work in both black and galvanized sheets. It can be readily formed, welded, drawn, cut and soldered.

Order U·S·S Copper Steel Sheets from our distributor in your territory. He can give you quick deliveries of all standard sheets.

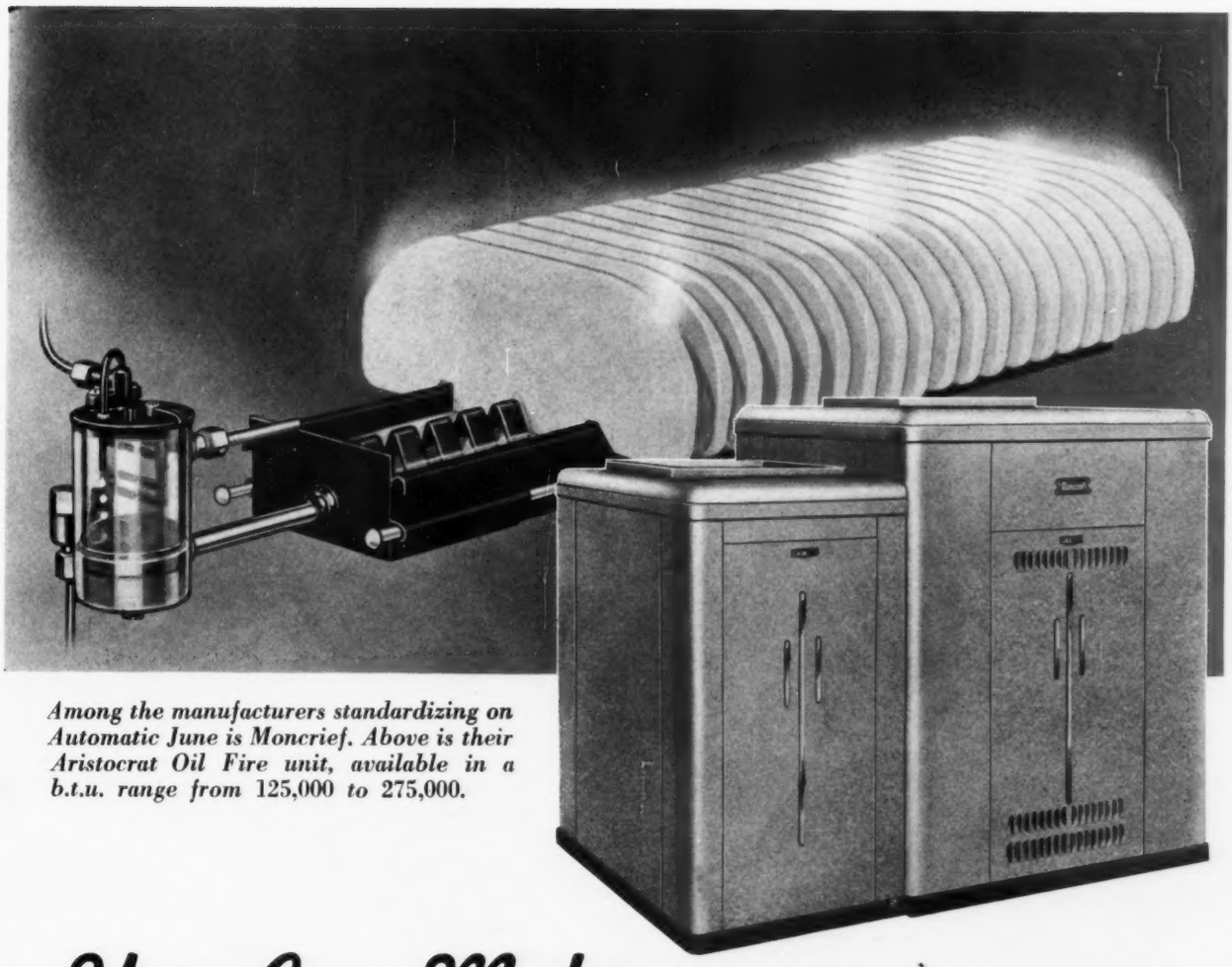

HOW MUCH DOES U·S·S COPPER STEEL COST? You can buy copper steel sheets which have 100 per cent more life for about 5 per cent more in cost than ordinary steel sheets.
USS
COPPER STEEL

SEVERE BENDING is possible with U·S·S Tight Galvanized Sheets. You can be sure that every sheet bearing the U·S·S label will roll without fluting or flaking.

U·S·S COPPER STEEL SHEETS

CARNEGIE-ILLINOIS STEEL CORPORATION, *Pittsburgh and Chicago*
COLUMBIA STEEL COMPANY, *San Francisco*
TENNESSEE COAL, IRON & RAILROAD COMPANY, *Birmingham*
United States Steel Products Company, New York, *Export Distributors*

UNITED STATES STEEL



Among the manufacturers standardizing on Automatic June is Moncrief. Above is their Aristocrat Oil Fire unit, available in a b.t.u. range from 125,000 *to* 275,000.

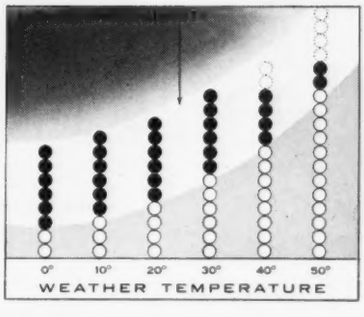
You Can Make MORE MONEY

SELLING CONDITIONERS EQUIPPED WITH "AUTOMATIC JUNE"

● If there is a weak spot in your sales story—a spot where past experience tells you that you might take a pretty bad beating—it throws your whole interview off stride. It not only costs you the sales you *should* lose, but it also costs you sales that you *shouldn't* lose.

Such is the situation with many dealers today. They are selling against the more fortunate dealers whose lines are standard-equipped with Automatic June Humidifying Systems and are discovering that humidity has become their weak spot.

The buying public is realizing that it is finally possible to secure humidity control that gives "never too little and never too much"—*and they like it.* It is becoming mighty hard to sell inadequate or uncontrolled humidity.



If you are not already selling *with* Automatic June, there are two things you can do. Either ask your manufacturer to give it to you or switch to a line that has it. We will be glad to send you a list of Automatic June standard-equipment lines and complete information on the units.

MONMOUTH PRODUCTS CO.

General Offices and Factory

1933 E. 61st St.

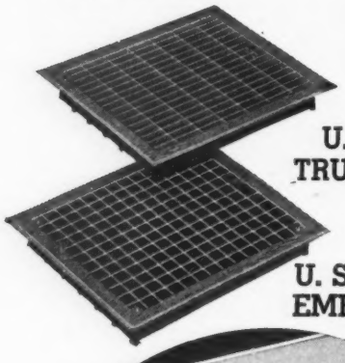
CLEVELAND, OHIO

AUTOMATIC JUNE

GRADUATED HUMIDITY CONTROL

PANAMA

NATIONAL



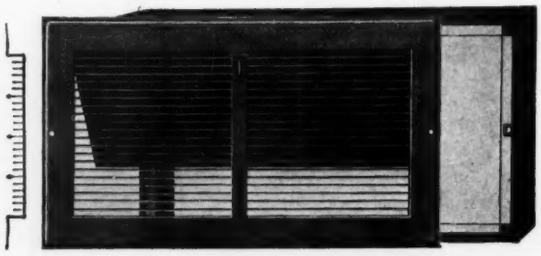
U. S. TRUSSTEEL

U. S. STEEL EMBOSSED

Christmas Greetings

As this busy year comes to a close we want to express our appreciation in this way to those jobbers and dealers who have cooperated so enthusiastically in the sale of U. S. Registers and Grills. The New Year looks bright and we hope that it brings to you a generous measure of success.

New Inset Panels for Louver-Type and Adjustable-Bar Registers.



U. S. Louver-Type Air-Conditioning Register—A Baseboard Setting that requires no Stud-Frame.

Write for complete general Catalog No. 27—1939 Edition.

UNITED STATES REGISTER CO.

BATTLE CREEK, MICHIGAN

MINNEAPOLIS • KANSAS CITY • ALBANY • SAN FRANCISCO • NEW YORK, N. Y.

Trouble-Free

SERVICE IN DAMP BASEMENTS *at no extra* COST

NEW Century FRACTIONAL HP MOTOR INSULATION

The new Century Insulation Treatment not only protects the windings against moisture but against oil and abrasive dust as well.

—ELIMINATES EXPENSIVE SERVICING
—INCREASES PRODUCT SALABILITY

The New Insulation Treatment is applied to the windings with the following results—

1. Resistance to deterioration.
2. Resistance to moisture absorption.
3. Cements the coils together.
4. Prevents "chafing" between wires wherever vibration is present.
5. Resists mechanical abrasion.
6. Is thin enough to radiate heat.

CENTURY ELECTRIC COMPANY
1806 Pine Street • • • St. Louis, Mo.

Offices and Stock Points in Principal Cities

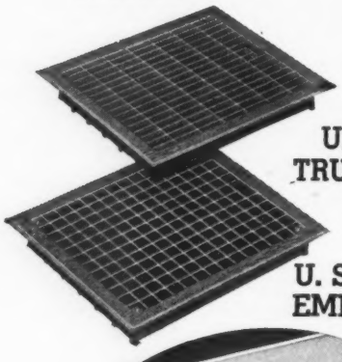
Atlanta • Baltimore • Boston • Buffalo • Chicago • Charlotte • Cincinnati • Cleveland • Dallas Denver • Davenport • Detroit • Houston • Indianapolis • Kalamazoo • Kansas City • Los Angeles • Milwaukee • Minneapolis • New Orleans • New York • Omaha • Philadelphia Pittsburgh • Rochester • Salt Lake City • San Francisco • Spokane • Seattle • Tulsa

Century MOTORS

ONE OF THE LARGEST EXCLUSIVE MOTOR MANUFACTURERS IN THE WORLD

PANAMA

NATIONAL



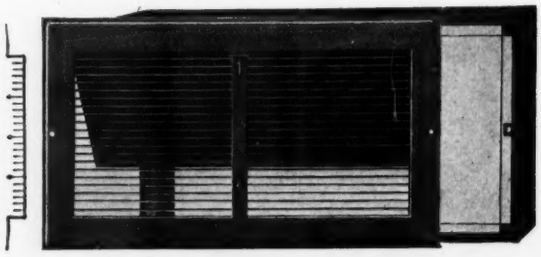
U. S. TRUSSTEEL

U. S. STEEL EMBOSSED

Christmas Greetings

As this busy year comes to a close we want to express our appreciation in this way to those jobbers and dealers who have cooperated so enthusiastically in the sale of U. S. Registers and Grills. The New Year looks bright and we hope that it brings to you a generous measure of success.

New Inset Panels for Louver-Type and Adjustable-Bar Registers.



U. S. Louver-Type Air-Conditioning Register—A Baseboard Setting that requires no Stud-Frame.

Write for complete general Catalog No. 27—1939 Edition.

UNITED STATES REGISTER CO.

BATTLE CREEK, MICHIGAN

MINNEAPOLIS • KANSAS CITY • ALBANY • SAN FRANCISCO • NEW YORK, N. Y.

Trouble-Free SERVICE IN DAMP BASEMENTS at no extra COST

The new Century Insulation Treatment not only protects the windings against moisture but against oil and abrasive dust as well.

NEW Century FRACTIONAL HP MOTOR INSULATION

—ELIMINATES EXPENSIVE SERVICING
—INCREASES PRODUCT SALABILITY

The New Insulation Treatment is applied to the windings with the following results—

1. Resistance to deterioration.
2. Resistance to moisture absorption.
3. Cements the coils together.
4. Prevents "chafing" between wires wherever vibration is present.
5. Resists mechanical abrasion.
6. Is thin enough to radiate heat.

CENTURY ELECTRIC COMPANY
1806 Pine Street • • • St. Louis, Mo.
Offices and Stock Points in Principal Cities

Atlanta • Baltimore • Boston • Buffalo • Chicago • Charlotte • Cincinnati • Cleveland • Dallas Denver • Davenport • Detroit • Houston • Indianapolis • Kalamazoo • Kansas City • Los Angeles • Milwaukee • Minneapolis • New Orleans • New York • Omaha • Philadelphia Pittsburgh • Rochester • Salt Lake City • San Francisco • Spokane • Seattle • Tulsa

Century MOTORS

ONE OF THE LARGEST EXCLUSIVE MOTOR MANUFACTURERS IN THE WORLD

OPPORTUNITY KNOCKS time and time again...

Right at your finger tips, waiting for you to grasp it, is a substantial volume of profitable business.

Stores, theatres, restaurants and other retail establishments have learned what it means to have an attractive front. Many have built new fronts or remodeled old ones—and there are thousands of others who can be sold.

In ENDURO Stainless Steel, Republic offers you a material that will help you to obtain a goodly share of this business. Its beautiful, silvery-white lustre lasts indefinitely. It catches the eyes of passers-by. Its cleanliness creates a favorable impression. It can be used in combination with practically any other material of any color. And, it can be fabricated without difficulty.

Many sheet metal contractors—such as the fabricators of this Rochester, N.Y., store front—are taking advantage of this opportunity by stocking and using ENDURO. Why not take the first step toward getting some of this business for yourself by writing for full information on ENDURO? Republic Steel Corporation, Alloy Steel Division, Massillon, Ohio—General Offices, Cleveland, O.

Whatever your needs in sheet products, remember that Republic makes a grade, size and finish for every purpose.

REPUBLIC STEEL

ENDURO

REG. U. S. PATENT OFFICE

REPUBLIC'S PERFECTED STAINLESS STEEL

REPUBLIC STEEL

...ILES STEEL PRODUCTS DIVISION
STEEL AND TUBES, INC.
BERGER MANUFACTURING DIVISION
...NION DRAWN STEEL DIVISION
TRUSCON STEEL COMPANY

AMERICAN ARTISAN

Volume 107 Number 12

25 Years of Cooperation; 20 Years of Research

As this issue of American Artisan reaches readers, the National Warm Air Heating and Air Conditioning Association will be holding its winter meeting in Cincinnati. This year's meeting is particularly important because the association celebrates twenty-five years of activity—its silver anniversary.

Important, too, this meeting, because it marks the completion of twenty years of continuous research activity—twenty years of cooperative investigation between the association and the University of Illinois.

Fitting, indeed, that on this silver anniversary, tribute should be paid to the men who have been president during these first twenty-five years. Seven of the men who have headed the association are still active—D. R. Richardson (1917-1918), W. G. Wise (1918-1921), I. L. Jones (1921-1923, 1931-1932), E. B. Langenberg (1923-1927), W. L. McGrath (1932-1934), H. T. Richardson (1934-1936), W. L. Rybolt (1936-1938). Three presidents will not be present —John D. Green (1914-1917), Charles E. Hall (1927-1929), J. M. Triggs (1929-1931).

These leaders and the scores of men who have contributed so generously of their time and effort have wrought something enduring. No matter what may happen to the association as an association, the results of twenty-five years of cooperative effort and twenty years of continuous research will continue to influence future human comfort long after the men who nurtured the effort have lost identity.

In these twenty-five years, problems of the industry which have caused many another association to "fold its tent and silently slip away" have caused their arguments and bickerings, but the association still lives.

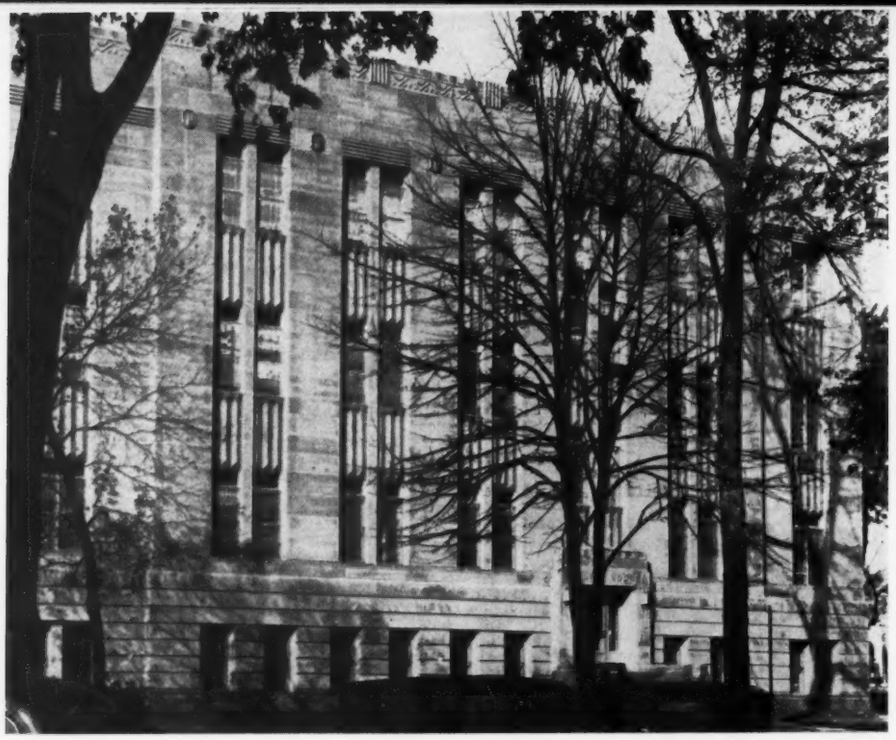
When this association was young and research work was just beginning the installation of a warm air furnace was a matter of the individual contractor's judgment and experience. He had no rules to go by, other than rules of thumb and his own experience; the manufacturer rated his equipment according to his own ideas or his competitor's corresponding product; that the buyer was generally satisfied will always remain a credit to pioneer warm air heating men.

In these twenty years, research has given the industry factual data for everything we do. By following these rules established through research, the contractor and the public need not fear that the installation will not work. On this research the industry has built a science of more healthful, more comfortable heating and air conditioning. Research has established warm air heating as the simplest, most economical, most satisfactory form of heating and winter air conditioning.

And now, in order that these research facts may exert their fullest service, the association has launched a cooperative publicity campaign to educate householders and prospective householders to the merits of warm air heating. The results of the research will be told in simple, non-technical language. Advice will be given to householders concerning the proper operation of warm air units and inquiries will be invited from writers, editors, home economists. Bulletins will be distributed to newspapers, magazines and broadcasters.

This campaign, as the fore-runner of a greater effort to acquaint the public with the things we have to offer, furnishes the last needed activity to one of America's greatest cooperative movements.

In the October issue, page 57, in the article entitled—"A Five-Zone, Gas System with Continuous Fan Operation" the statement was made that control instruments were Minneapolis-Honeywell units. This was an error. All control instruments used were Barber-Colman, designed especially for this type of system which has fixed air deliveries with constantly changing register air temperatures according to the demands of each zone.



Spandrel Ornamentation

THE Dodge County court house, Juneau, Wisconsin, designed by architect R. R. Boyd of Beaver Dam and built by general contractor W. H. Farley, New Lisbon, is ornamented by Leadtex spandrels and protected by Leadtex coping sections fabricated and installed by the sheet metal firm of C. F. Warning Company, Oshkosh.

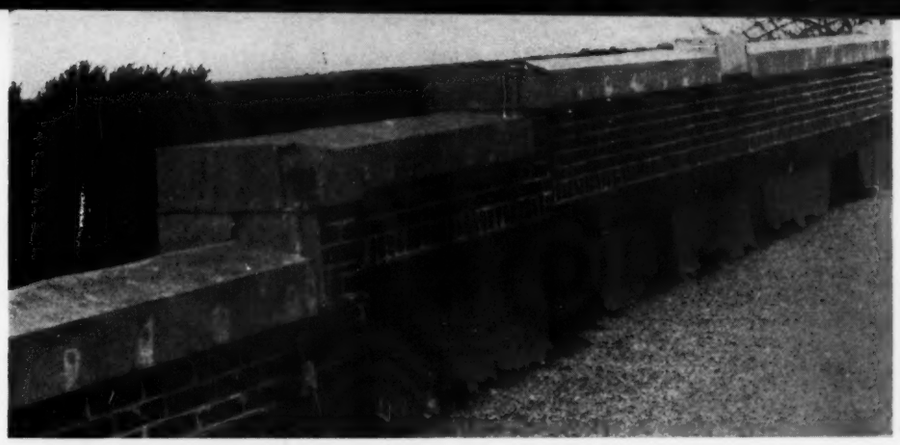
The ornamental spandrels were made up in the Warning shop as shown in the sketches. For the building, 20 plain spandrels, 25 ornamented spandrels and 5 spandrels with a ventilating grille were required. All spandrels were 3 feet wide by 6 feet 6 inches high and were formed and assembled as shown in the sketch of a spandrel with ventilator. The main face was fluted from a single sheet; the top dentil was made up from one piece with inset full and half diamonds; the lower sawtooth was made from one piece soldered to the main sheet.

For the spandrels having the ornament, the face was formed and assembled, as described, with the ornament made in the Warning shop as shown in the ornament detail. The small tulip drops at the top of the ornament were stamped and the half balls at the bottom were spun from lead coated copper by Friedley-Voshardt Co., Chicago.

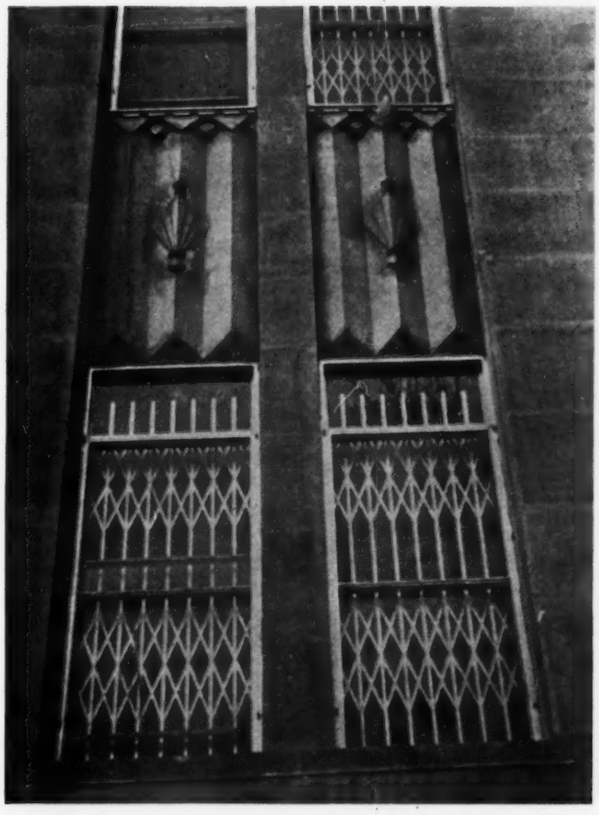
The AAA Leadtex (Revere Copper and Brass Inc.) was used in 15 and 25-pound coating per 100 square feet. This material is sheet copper coated with pure lead which gives a smooth, unmottled, finish much like dull chrome.

As two of the photographs show, the masonry copings of the building are protected against water penetration with Cheney Through Wall flashing using prefabricated corners locked to the base flashing as shown. In addition, the parapet is protected by a Leadtex coping cap formed as shown and applied in sections soldered together after erection. The coping cap, incidently, is unusually deep, extending down the vertical sides of the wall several inches. The coping cap is anchored to the masonry with tinned brass screws.

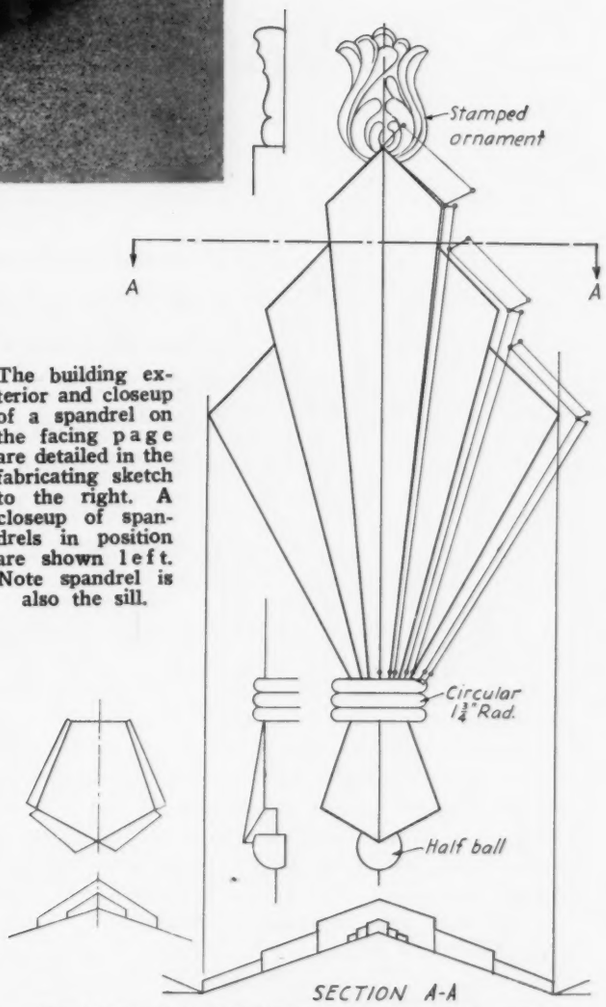
For the spandrels and coping approximately 4,000 pounds of Leadtex copper were used.



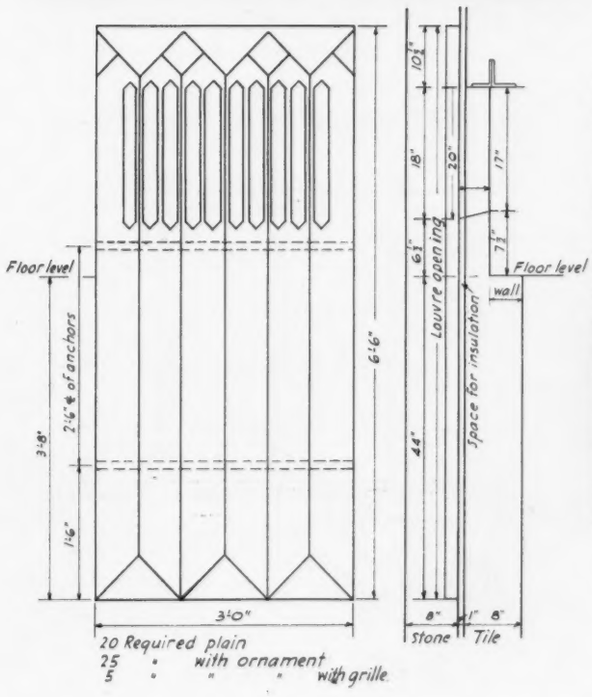
Photographs by courtesy of Revere Copper and Brass, Inc. Sketches by C. F. Warning Co., Oshkosh

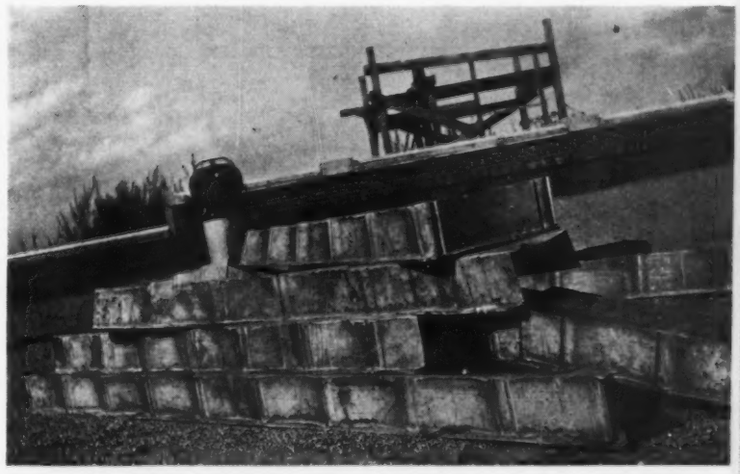


The building exterior and closeup of a spandrel on the facing page are detailed in the fabricating sketch to the right. A closeup of spandrels in position are shown left. Note spandrel is also the sill.



The detail at the left shows a spandrel with ventilating louvre. All spandrels are identical in size and assembled as shown in the drawing.





The photograph at the top of this page and the photograph immediately above show coping in place on the wall and piled as sections ready for placing. Note tinned screws in apron.

Gravity Warm Air Heating for

TOBACCO DRYING BARNS AND CABINETS

In several past issues of American Artisan we have published articles describing the application of warm air heat to ear seed corn drying. This article explains another drying activity, tobacco, which, because of its wide distribution and antiquated methods, seems to offer a broad field for warm air heating application.

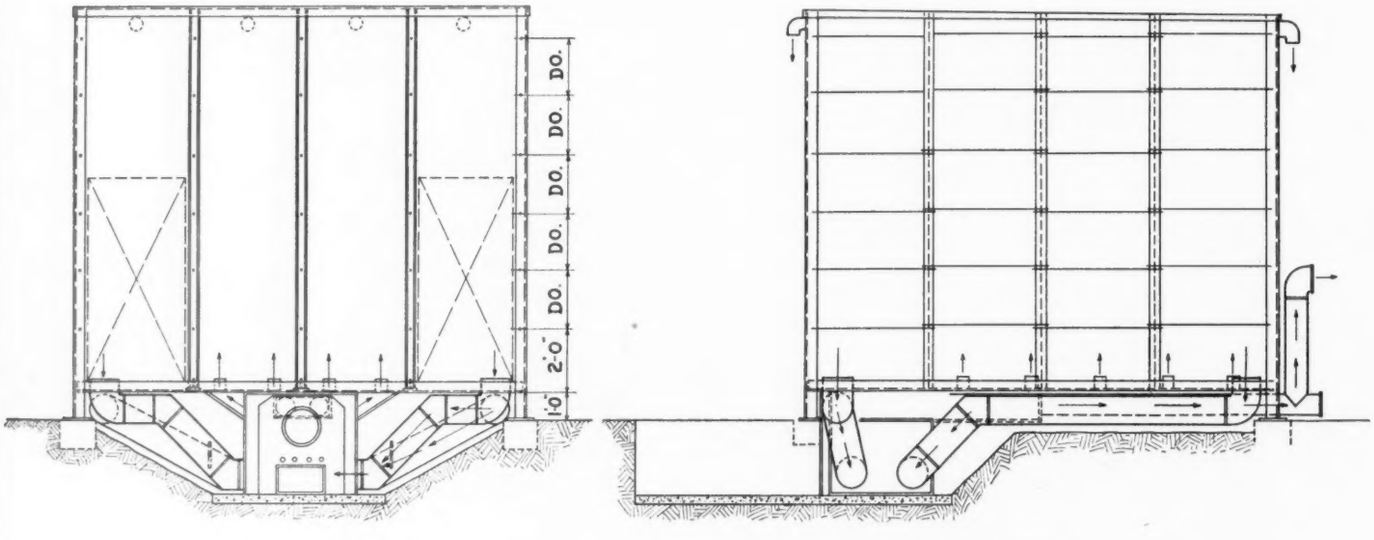
THE raising and curing of tobacco as necessary and important steps in the preparation of cigarette, cigar and chewing tobacco has, thanks to radio and national advertising, focused attention of growers on possible better methods which reduce the quantity of poor grade and spoiled leaves and make possible a more uniform and better priced crop.

Contrary to some notions tobacco is now raised in several parts of North America and is no longer a product cultivated only in our Southern states. Believe it or not, tobacco acreage is substantial in Canada, Massachusetts, Connecticut, New York, Pennsylvania, Ohio, Indiana, Wisconsin, Minnesota, Missouri plus, of course, the Southern states of Maryland, the Virginias, the Carolinas, Georgia, Florida, Kentucky and Tennessee.

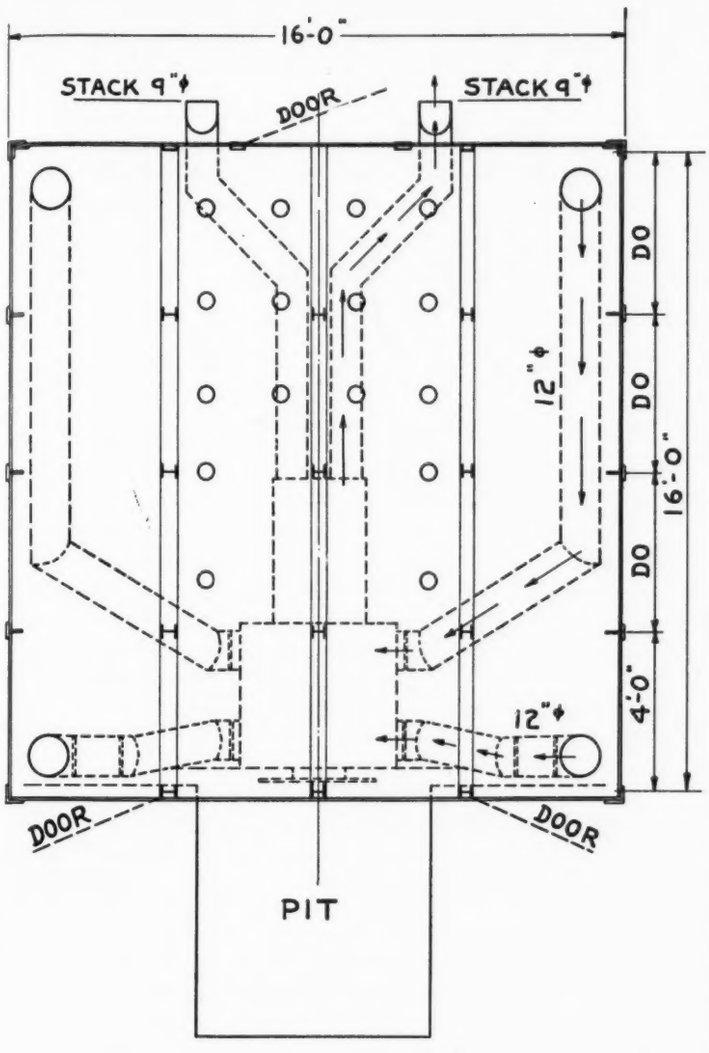
Equally important with the raising is the curing—in fact, some authorities lay more emphasis on curing than on raising and in curing (speaking of modern methods and ideas) the warm air heating industry seems destined to play a rapidly expanding place of importance. With raising of tobacco so widespread, what develops for the warm air industry in any one given area will likely find equal acceptance by growers in all other areas.

The adoption of curing methods employing warm air heating is illustrated in a report submitted by H. A. Bertossa (Bertossa System of Air Conditioning, Jackson and Church Co., Saginaw, Michigan) describing recent experiences in developing and installing a warm air heated, tobacco drying cabinet and furnace. Mr. Bertossa says:

"Last July I was called to Winston-Salem to see if I could offer any suggestions for improved drying



FRONT VIEW SIDE VIEW



PLAN VIEW

Above and on the facing page, details of the tobacco drying cabinet described in this article. The location and arrangement of the simple gravity heating plant is clearly indicated.

methods. The method, now in use, has been employed for the last 60 years. Several manufacturers have tried to introduce gravity oil burning heaters in log barns, and have been unsuccessful.

"I was taken to an experimental farm at Oxford, where the whole process was explained to me. The curing of this tobacco is very exacting. It is the cigarette, thin-leaf type, and must be colored, cured and cased perfectly to net the planters any profits for their year's work. And I wish to state, tobacco raising is real work.

"When I was able to digest the situation, it amounted to this:

"Log barns are inefficient. Temperatures varied as much as 20 degrees. Furnaces or heaters were not controllable. The combination of barn and furnace made a veritable fire trap on which planters cannot obtain insurance. Impossible to control temperature. My conclusion was that it is not only the furnace, but rather the whole outfit that requires changing.

"Curing cigarette tobacco must be done as follows: The bottom leaves of the plant are taken first. They are hung in barns on sticks 5 feet long. The average barn holds 600 sticks at a charging. The tobacco is then left without heat until it attains a certain yellow color, usually about a day and a night. The furnace is then fired and a temperature of 95 degrees is maintained until the color is a bright yellow. Temperature is then raised to 180 degrees and dropped back to 95 degrees in a 3-day period. The tobacco is then dried out completely. It is also very brittle. At this time the barn is opened and moisture added to leaves, or as they call it, the leaves are cased.

"The tobacco is then held by planters until buying time when it is taken to the local warehouse and sold by the sing-song auctioneers.

"As a result of this inspection I built the cabinet unit shown in the sketches. The cabinet and furnace were loaded in a truck and shipped to a farm 10 miles out of Winston-Salem, set up and used to cure a batch of tobacco. This procedure took two weeks. This is what we accomplished.

New Equipment Accomplishments

"One day off charging time. Due to accessibility of cabinet over barn, 100 more sticks of tobacco, due to method of hanging. Cured leaves for half of former cost using coal. This was figured on the basis of planter cutting his own wood, which sells for $4.00 a cord. He would use 1¼ cords for one curing. We used $2.20 worth of coal. Using 8 thermometers we did not have as much as ½° variation during the process. The fire hazard was completely removed. In other words, planters can have their cabinets moved to their barnyards. As it is now, barns are set far away from homes because of fire. There are at present about 250,000 barns in North Carolina. Of these, about 18% burn each year, tobacco and all. This is a total loss to the planter as he can obtain no insurance at all.

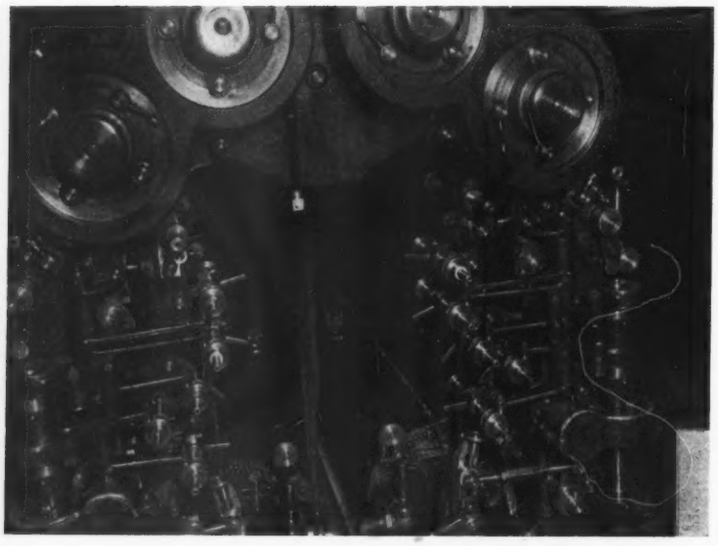
Detail of Design and Operation

"The cabinet is 16x16 feet and sets 12 inches off the ground. The heater is built to use stoker, oil burner or may be hand fired. In other words, some of the wealthy planters will want stokers. However, the heater is built for economy, no matter what the firing method.

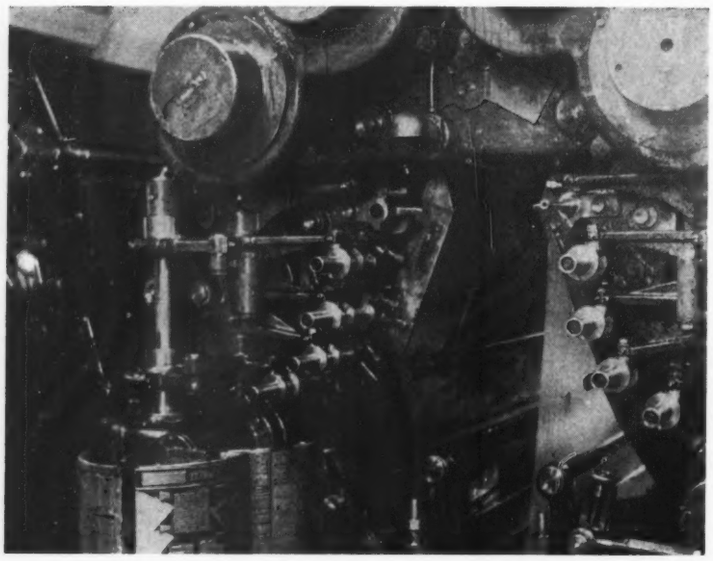
"No blower is used on this installation. Leaves must not be agitated. The sketches show the method used for air distribution. Air is introduced through sleeves across the entire center portion of the floor. Return is taken back from each corner. Exhausts are at the top on each end. Every opening is controllable. Heater is over-sized to allow for maximum length of firing periods.

"The walls of cabinet are double, having a 2 inch dead air space. This is to eliminate insulation.

"While this unit was designed for a particular grade and type of tobacco, the problems of curing are the same for most all tobaccos. With tobacco acreage increasing and better curing needed, this ought to be an active market for the warm air heating contractor."



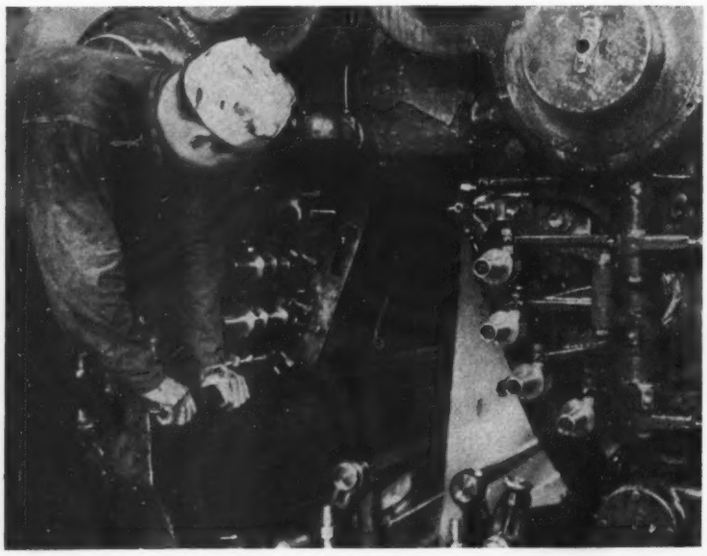
Ink rolls and fountain in a high-speed press. The problem is to cover the rolls without interfering with operation.



Above—Rider-roller unit with ink mist cover in place. This is a special cover to enclose the extra roller.

◆

Below—Pressman removing ink roll cover. Screen door catches and hooks make removal quick and easy.



Sheet Metal Covers for Printing Press Ink Rolls

By C. H. Faille

A CONDITION has recently developed in rotary web press printing plants that promises to be a source of extra business for the sheet metal contractor. Modern high speed rotary presses with ink rollers exposed and turning at terrific speeds are throwing off ink into the pressroom air in the form of a mist. The mist, besides being a possible detriment to the health of the pressmen, combines with paper dust in the pressroom and settles into delicate gears and other press parts causing unusually rapid wear.

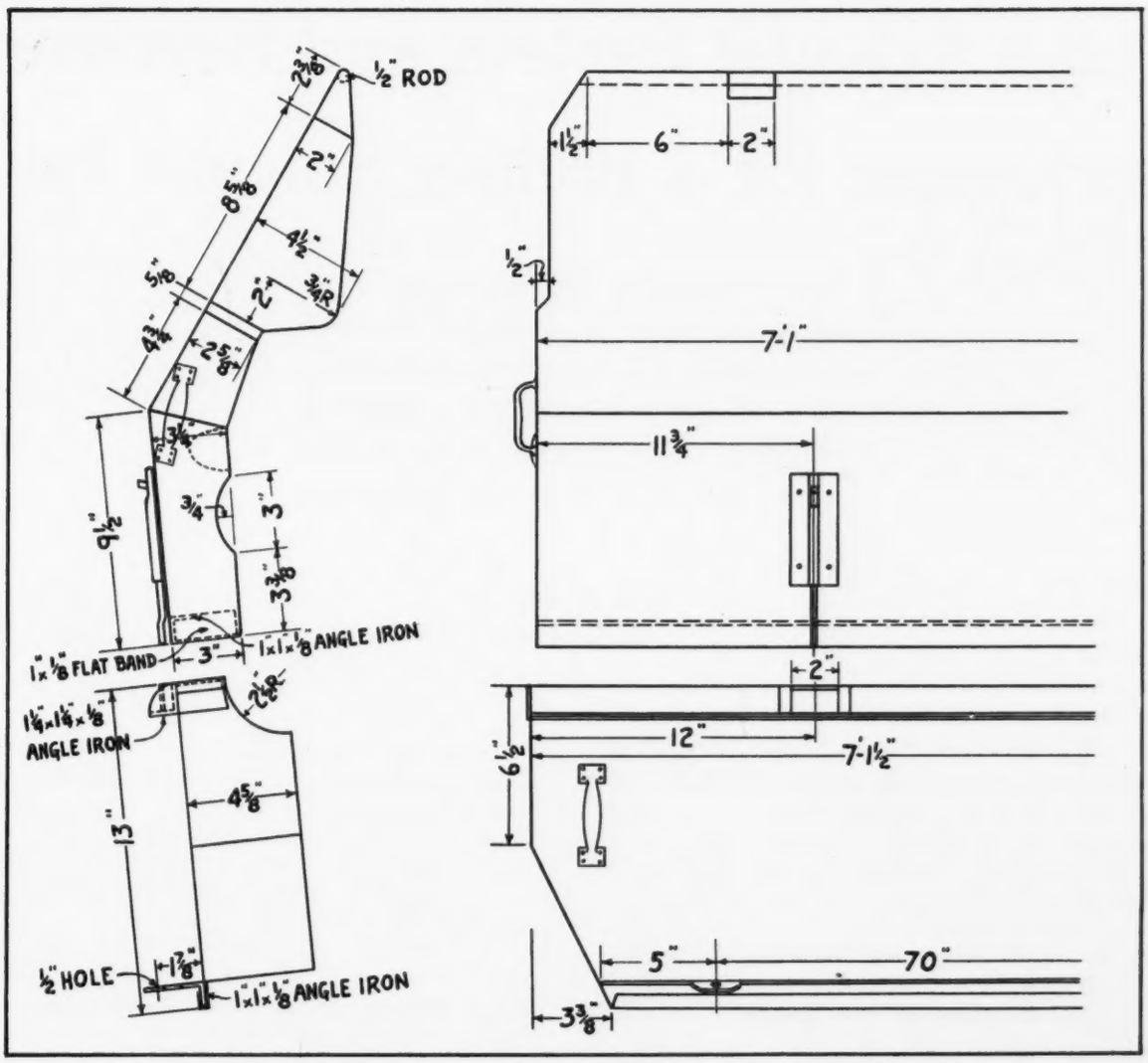
One publishing plant, in its search for a remedy to this condition, found that the least expensive and most effective way to correct the ink mist condition was to cover the ink rollers of each press unit with sheet metal hoods. These ink roll hoods catch the flying particles of ink as they are thrown off the rollers and return them to the ink fountain in a simple, direct and effective way. The sheet metal work, after the first covers were shaped, fitted and a pattern made, involved little expense and required no extra shop equipment or technical printing knowledge.

Sheet metal worker E. Zink of Brenner Brothers, Brooklyn, New York, who fitted and placed more than fifty pairs of these hoods for a New York publisher, tells of his experiences in completing the job most effectively.

The covers, the publisher told him, had to be easily and quickly removable. They could not interfere with the normal operation of the press. They had to be heavy enough, and securely fastened, in order to prevent rattling. Finally, too, it was desirable, if possible, that the covers should collect the ink thrown off from the ink rollers and return it to the ink fountains free of oil.

With these instructions in mind Mr. Zink started experimenting with the metal to be used. Twenty-four ga. sheet was tried first, but was discarded for 18-ga. blue annealed steel. Oddly, the reason for discarding the 24-ga. sheet was not because it was too light and rattled with the vibration of the presses, but because the pressmen handled it too roughly when removing it to get at the rollers to make adjustments and repairs. It dented and bent too easily and soon was in such bad shape that it could not be refitted to the press unit.

Substitution of the 18-ga. sheet for the 24 corrected this condition. The additional weight of the 18-ga. re-



Patterns and dimensions for 18-gauge, blue annealed steel hood sections showing hardware.

quired that it be picked up and removed to an out-of-the-way place. Kicking it carelessly aside hurt the pressmen's foot more than it did the cover.

The shop work of cutting, shaping and fabricating the sheet metal into covers that will follow the contour of the ink rollers is amply illustrated in the detailed drawing. The dimensions on this drawing are for a certain make and model of press unit and will not apply to all web presses. Every make and model of press unit will undoubtedly call for different dimensions.

The principle of shape, fabrication and material shown by the drawing, however, have proved by accurate tests to be effective even beyond the hopes of its originators. Not only does the hood eliminate most of the ink mist from the pressroom air, but as ordered, it acts as an ink recovery system as well.

In some pressrooms, particularly tabloid newspaper pressrooms, where the first page of the paper is entirely pictures, the press printing page 1 has an additional roller, called in pressroom parlance, the rider roller. Covers for this unit of a press will require a special pattern and different dimensions because the rider roller protrudes away from the ink rollers slightly. The pictorial illustrations accompanying this article are snapped from the rider roller unit.

The problem of fastening the hoods to the unit so that they could be quickly and easily removed and at the same time be free from annoying rattles was a puzzling one. Bolting the hoods to the unit was out of the question. Removing and replacing bolts required too much time and the bolts were too easily misplaced or lost.

Screws were tried first, but they, too, proved inadequate because they became lost and the hoods were not replaced after pressmen had removed them to make necessary ink roller adjustments. Finally, the "catch" and "hook" idea was hit upon. Simple screen door catches placed in proper places together with small door hooks held the hoods sufficiently firm. Thus, removing the hoods became the simple matter of snapping or unsnapping screen door catches, and hooking or unhooking screen door hooks.

Another characteristic of the ink hood covers which required some thought was how to return the ink collected in the hoods to the ink fountains free of machine

(*Continued on page* 39)

Fume Exhaust System and Recovery Exchanger for a Boiling Solvent Tank

This article explains the problems and shows the special equipment developed to remove obnoxious fumes and recover most of a boiling solvent through condensation in a water-fume exchanger. Only materials to be found in most sheet metal shops were employed.

By J. W. Baybutt
Rochester, N. Y.

AN EXHAUST system that will pay dividends and protect employees' health was designed recently for a special process tank. In the mixing process, certain low boiling solvents which happen to be costly and also obnoxious to humans are generated. The original problem was to exhaust these fumes to the atmosphere, but on investigation it was readily seen that the installation could be justified on the possible recovery value.

Basic Laws of Fume Removal

From the standpoint of the fume removal, certain fundamental rules had to be followed to adhere to good ventilation standards. The volume of air to be handled was first based on the size of the opening in the tank cover. Knowing the solvent loss per hour, the next step was to check to see that this amount of air would handle the solvent vapor equivalent. The latent heats and boiling temperatures of the materials have to be obtained for this computation but these are readily available in chemical handbooks.

In this case it was decided to design for partial recovery, which would allow a relatively low-priced original installation to serve as an empirical guide for future and more complete installations. Having determined the amount of air to be handled, the temperature drop and the pounds of vapor to be condensed, it was a simple matter to compute the Btu per hour to be handled in the equipment.

As an example, assume the total Btu to be 28,000 per hour (allowing for equipment loss) and 300 cfm of air. The next step is to design an inexpensive heat exchanger or condenser. Low temperature water happened to be available for this particular job, but refrigeration might be more efficient for complete recovery. The following computations are based on 50° F average water temperature and air temperature drop from 140° to 100° F.

The amount of surface exposed to the fume laden air is then determined roughly by the formula $H = U \times T.D. \times A.$ in which H equals heat to be transmitted, U equals coefficient of heat transfer as customary, T.D. equals temperature difference and A equals area in sq. ft. required on air side of interchanger.

Substituting in the formula we have

$$28{,}000 = 4 \times (120°\text{-}50°\ \text{F}) \times A$$
$$\therefore = 100 \text{ sq. ft.}$$

The U factor of 4 can be expected under these conditions particularly with the turbulent type of surface shown, although there may be some disagreement between authorities on the subject. The water side surface should not offer any concern as it will be agreed that with any appreciable water velocity the 4 U factor equivalent can be expected.

Construction Shown in Details

The figures 1a and 1b show the general arrangement of the equipment, the exchanger providing partial condensation and the eliminators serving to knock down the liquid which can then be drained off. Corrugated metal offers certain advantages in the exchanger design particularly in creating a turbulent air flow and providing a rigid wall to withstand the head of water.

Figures 2a, 2b, 2c show typical details and should be self-explanatory. On the basis of 100 square feet of surface required, the exchanger will have to be made about 4 feet long as each square foot of cross section will provide about 25 square feet per running foot.

The water consumption can be readily figured knowing the temperature differential. On the 28,000 Btu basis and 20° rise in water temperature, 1400 pounds of water per hour will be required.

There are very likely many other types of heat exchanges suitable for such service, but the design submitted is one that can be made in an ordinary job metal shop due to its simplicity.

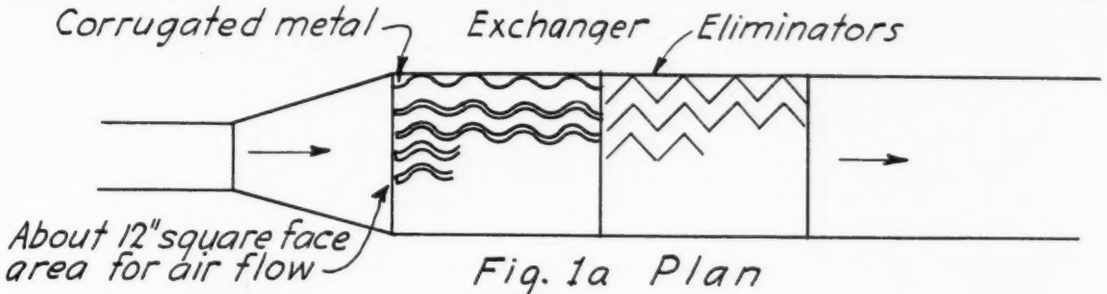


Fig. 1a Plan

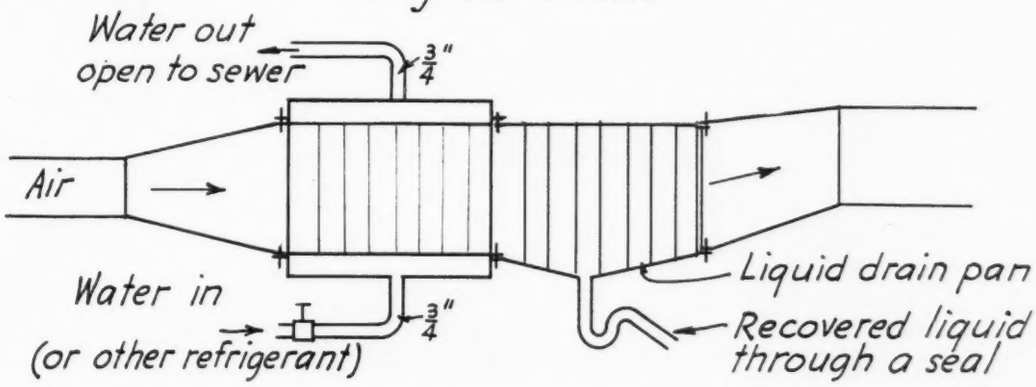


Fig. 1b Elevation

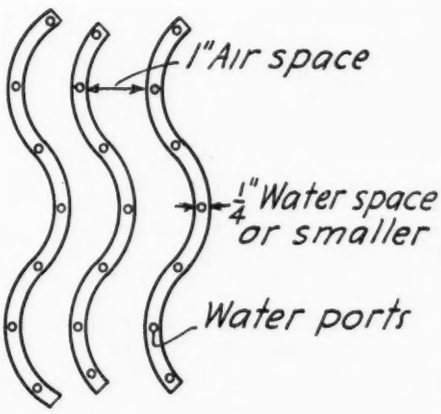


Fig. 2a Plan of corrugated metal.

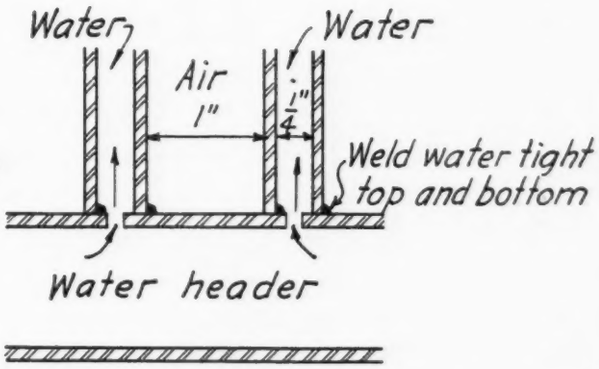


Fig. 2b Detail at water header Similar for top

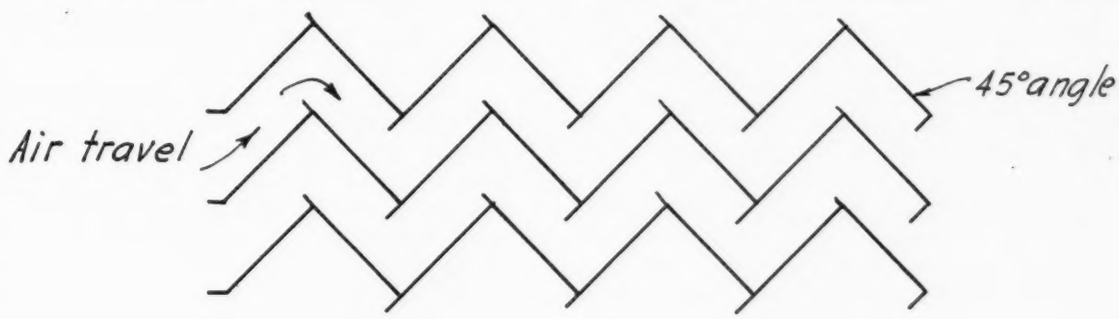
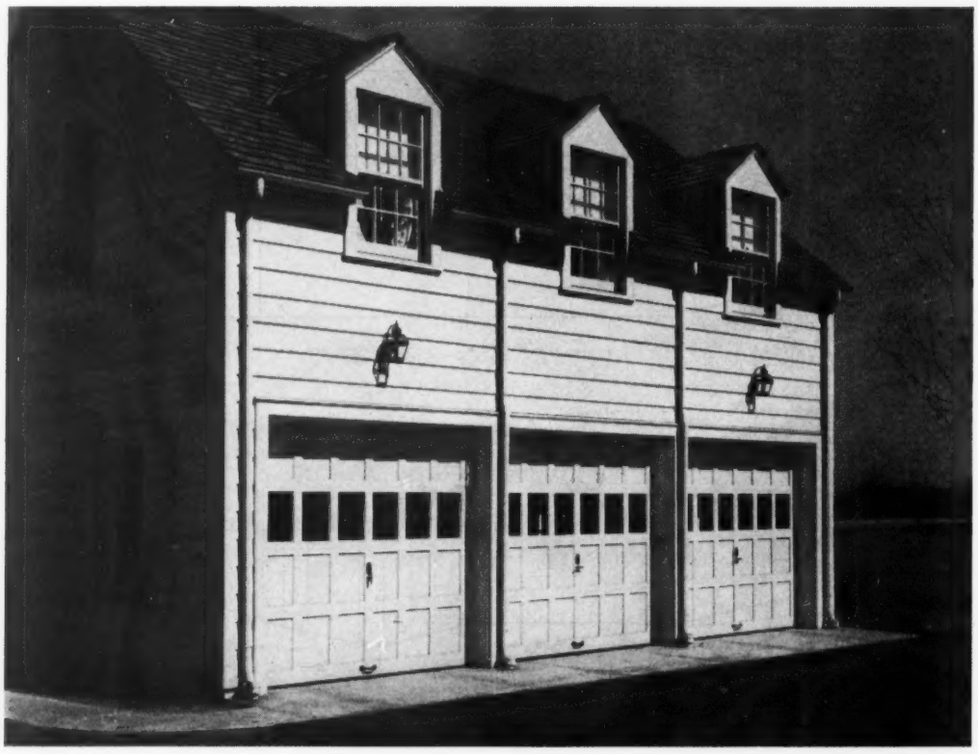


Fig. 2c Plan of Eliminators



Photograph by American Rolling Mill Co.

A review of some fundamental requisites for

GUTTERS, LEADERS and DRAINAGE

By James McCawley
Secretary, United Roofing Contractors Assn.

THE primary purpose of gutters and leaders is to carry water off as fast as possible and prevent water standing on the roof. It has been estimated that twenty tons of water, frozen and liquid descend over the roof of an average house every year.

On sloping roofs, the valleys deliver water to the gutters which, in turn, deliver the water to the leaders. On the average one-family home of the detached type there are about 250 feet of gutter and leader. This is ample for all requirements, but if badly designed often less than half of the drainage system is operating efficiently with disastrous results to the structure.

Gutters and leaders should be designed to take care of all normal rainfall conditions and abnormal conditions in the locality concerned. Rainfall records, which can be obtained from practically all newspapers, show an average rainfall measuring from 2 to 6 inches deep, depending on the location. Over a period of twenty years in one area it was noted that, while the normal rainfall was around 3 inches, on a half-dozen occasions this figure rose to 5 inches, and on perhaps two occasions reached 8 inches. The last two were evidently freak storms and can be dismissed, but the gutter and leader system should be designed to take care of the 5-inch figure. These records, by the way, are computed on the maximum intensity in inches per hour lasting five minutes.

The size of the gutter required depends on the size of the leader which, in turn, depends on the area of the roof to be drained. A safe rule to follow in figuring the size of the leader is to use 1 square inch of leader area for each square (100 sq. ft.) of roof area. The cross-section area of a 4-inch plain, round leader is 2 squared multiplied by 3.14 or $2 \times 2 \times 3.14 =$ 12.57 square inches. According to the rule mentioned above, this leader will empty 1,257 square feet of roof surface or roughly 12½ squares.

On a building 50 x 20, half pitch, the total roof area is 1,420 square feet, 710 square feet on each side. According to the rule, this would indicate two 3-inch leaders, one on each side of the roof, each caring for 707 square feet of drainage, and two gutters 1 inch wider than the leaders. While this might be expected to take care of normal conditions it would be wiser to choose 4-inch leaders caring for a total capacity of 1,257 square feet of roof area on each side. In other words, the two larger leaders would efficiently carry away 75% more water than the normal rainfall.

In buildings less than 40 feet long the gutter may be the same size as the leader. In larger buildings, if

the spacing of the leaders is over 40 feet, the gutter should be 1 inch larger than the leader for every 20 feet or fraction of gutter length. Gutters should be shallow rather than deep, and should be sloped an average of 1 inch in 16 feet. Deep gutters with insufficient pitch are less than useless. Water moves too slowly to the outlet and in cold weather freezes easily. The depth of the gutter seems to attract stray paper, leaves and other rubbish which collect in the gutter and lead to clogged outlets. Ice forms easily enough without lending it the aid of twigs and other refuse as a building material in the formation of ice dams.

Ice Dam Problems

The serious problem with ice dams is not the preventing of water travelling down the leaders, but the fact that water develops a tremendous pressure in freezing always expanding. These thrusts result in broken seams and gutter leaks. If the gutter empties from a roof covered with individual roofing units, the ice is liable to build up until it pushes the units upwards and sends its icy fingers under the flashing to melt on contact with the warmer inside roof surface from where it descends into the interior.

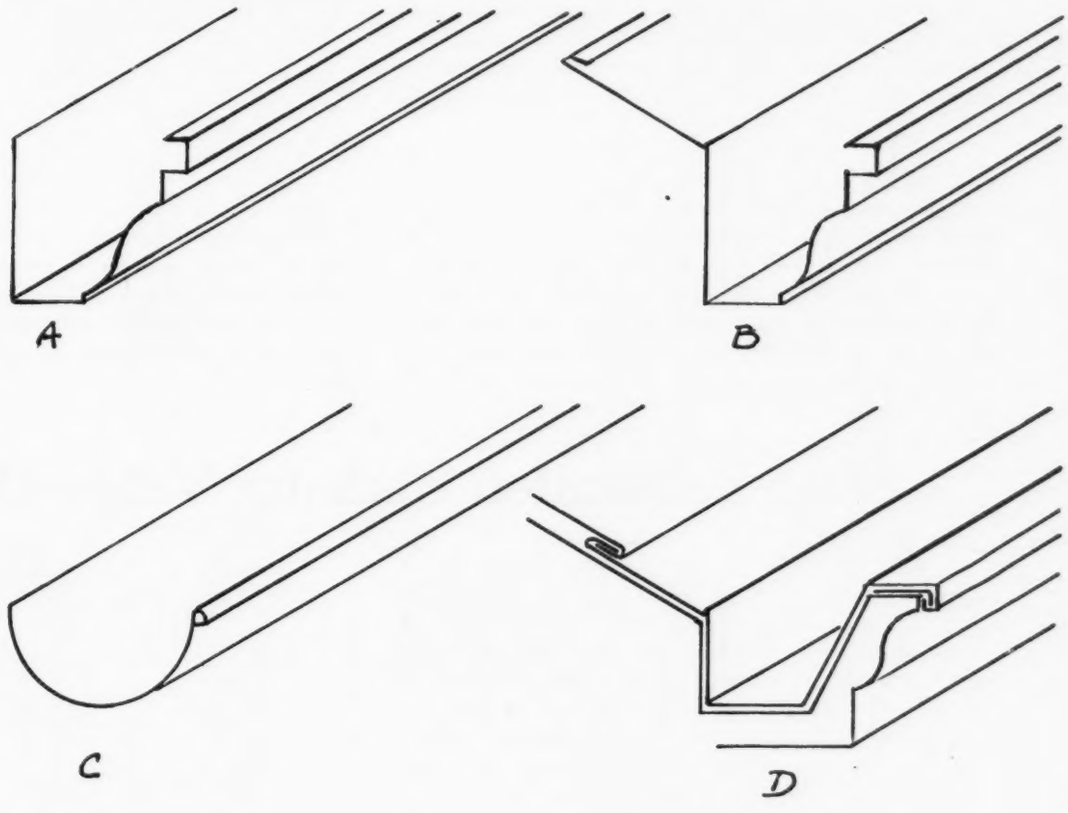
The ideal gutter should have a depth equal to one-half or three-quarters of the width of the gutter. Shallower gutters are useless in heavy rains because such gutters carry the water to the leaders faster than the leaders can take care of it and overflow results. A similar result is caused by the outlet tube above the leader being too small. This tube should be just small enough to enter easily into the top of the leader.

Over-flows result also from too few leaders; result, leaders unable to cope with the quantity of water thrust into them. However, this happens occasionally from another cause. A house may have an adequate supply of leaders, but may not have them properly spaced, two leaders being idle and the remaining two attempting to do all the work.

Corrosion, Flat Decks, Strainers

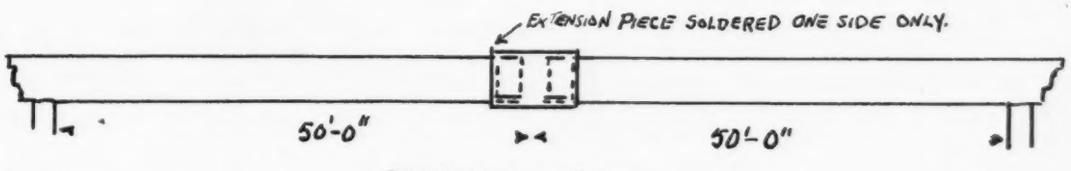
In installing gutters, it should be remembered that the metal is subject to expansion and contraction. Copper should not be installed in greater lengths than 75 feet without some provision for expansion. Zinc, with a greater coefficient of expansion should have expansion joints in gutters 60 feet and over. Lack of such provisions will cause buckling and breaks in the metal.

In flat roofs the chief trouble with drainage is the lack of over-flow facilities, particularly where the roof



The photograph opposite shows an attractive installation of gutters and leaders, so arranged that the drainage system contributes to the exterior appearance. The material is Armco Galvanized Paintgrip sheets. Drainage units sized from the Armco Roof Leader Selector (slide rule).

At right—Familiar drainage sections. A—common Ogee gutter; B—Ogee gutter with apron; C—half-round gutter with bead; D—built-in wood gutter covered with metal. Note — the gutter apron should extend at least 2 inches above the high point of the outside of the gutter.



is enclosed by parapet walls. If the roof drain is clogged, water gathers in the immediate vicinity and ascends the wall until it covers the flashings, seeps through the wall behind the flashings and down into the interior. The remedy is the provision of scuppers or over flow drains.

There should at all times be strainers or similar devices placed above outlets to prevent rubbish from being carried down the leader. These should never be made of corroding metal, as such metal even if dipped in hot zinc will soon have the protective coating removed by the constant flow of water. In such a case these strainers by falling apart into the leader accomplish the very thing they are designed to guard. The best type of strainers are manufactured of copper, brass, or bronze. In recent years chemicals have been introduced which, in a container combined with a strainer, melt any accumulated ice and prevent it from forming in the leader. Another form is in the shape of a brick which is fastened to the roof a few inches away from the outlet.

Built-in Gutters

In built-in metal covered wood gutters, the usual complaint is the shrinkage of the wood and consequent distortion of the metal. Three types of leaders are manufactured, plain round metal, round corrugated metal, rectangular corrugated metal and round cast iron leaders, the last being used almost universally in England and other parts of Europe.

If ice builds up in plain round leaders, something has to go and usually it is the seams of the metal. As metal seams (in good practice) usually face the wall of the building, sometimes the leak is not discovered until a great deal of harm has been done. The best type of leader is the corrugated material. The corrugations stiffen the metal and allow room for expansion should ice build within, and there is little danger of the leader expanding sufficient to break the seam.

Leader Sizes and Spacing

Leaders should never be less than 3 inches in diameter or 1¾ x 2¼ inches rectangular, unless for small porches. In small houses it is customary to place the leaders at the corners of the building. Where it is necessary to introduce bends into the leader arrangement, these should be as steep as possible, as any rubbish washed down the leaders will inevitably build up a dam at the break in the leader. The ideal arrangement is to dispense with bends. The practice in gable houses of connecting two corner leaders with another leader running at an angle straight across the front or rear of the building, besides spoiling the appearance of the house, is merely an invitation to trouble.

This admonition should not be uttered here except for the fact that the writer has seen it done. Gutter, leader and other metal accessories should be fabricated of the same metal. Installing leaders of one metal and gutters of another or some equally absurd construction invites one metal to attack the other.

The following table shows the area of roof drained for the most popular types of leaders. All the sizes are for round leaders, but as there is very little difference, may be used for rectangular leaders of appropriate sizes.

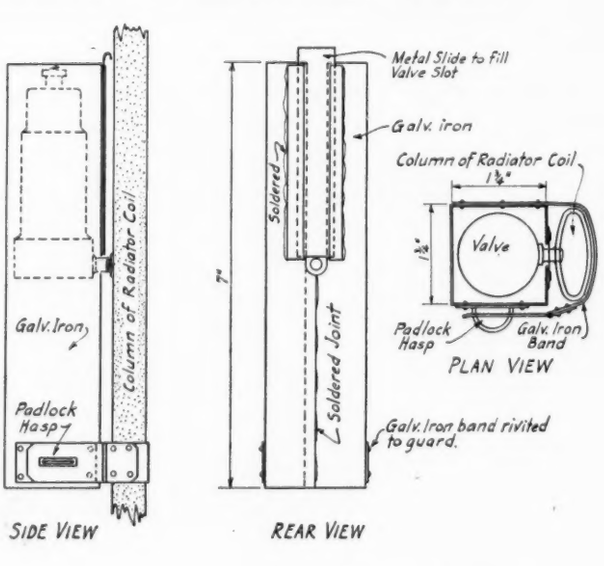
Leader Pipe Size, Dia. In.	Leader Pipe Area in Sq. In.	Roof Area Drained in Sq. Ft.
3	7.07	707
4	12.57	1257
5	19.63	1963
6	28.27	2827
7	50.26	5026

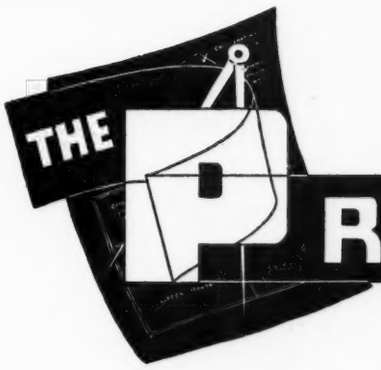
For roofs of factory buildings, the common practice is to use 6-inch gutters and a 4-inch leader every 40 feet for a roof span up to 50 feet. Over 50 feet and not exceeding 70 feet, a 7-inch gutter is recommended with a 5-inch leader every 40 feet. From 70 feet and over use an 8-inch gutter with 5-inch leaders every 40 feet.

Shop Fabricated Radiator Valve Covers

A SHEET metal contractor (Sam Ryan, Chicago) some time ago designed a cover for radiator valves to prevent these valves being removed from radiators in an office building. The radiators are located in the hallway of the building where it is comparatively easy for a prowler to detach the valve without being seen by occupants. Since each valve costs about $15.00 the removal represents a substantial loss to the building owner.

The cover developed is made of galvanized iron and is a box about 1¾ inches square. A slot in the back allows the guard to be slipped over the valve without removing the valve. A band of galvanized iron riveted to the bottom of one side extends into the radiator and passes around one of the radiator columns and is padlocked to the opposite side of the box. A metal slide running in grooves covers up the slot where the box slips over the valve.





Your comment or experience is invited.

PROBLEM CORNER

Condensation Ruins Woodwork

American Artisan:

We have a five-room, frame cottage in which there is a 20-inch, cast iron furnace with six warm air pipes and two cold air returns. The owner of this system states that moisture accumulates on his windows to such an extent that it has rotted the woodwork. He stopped using his water pan two years ago, but every time he builds a fire in the furnace this excessive moisture accumulates on the windows and some on the walls. We have examined this job and have been unable to find any reason for this unusual condition. We will be grateful if any reader has had similar trouble and remedied the cause.

P. S. P., Tennessee.

Reply by
The Editors

This moisture which accumulates must come from sources within the building and these sources might be condensation from unvented gas heating equipment or laundry operations or steam generated in the kitchen or any one of a dozen other sources.

The only fact we have is that moisture is present and must come from some source within the building and our only useful suggestion is that you visit this job some time when the moisture is particularly bad and track down every possible source of origin.

◆

Covering a Tin Roof

American Artisan:

We have a prospective job of putting a built-up roof on a building now covered with a tin roof. The tin leaks badly and has been patched a good many times and in various ways. Should this old tin roof be completely removed and a new three-ply felt and asphalt built-up roof laid or can we get a satisfactory job by mopping one-ply of 30-pound felt onto the tin and then covering this with a second 30-pound felt well mopped down and mopped over?

W. D. W., Nebraska.

Reply by
The Editors.

If the tin roof you describe in your letter of March 24 is as badly pitted and broken as indicated, we would recommend that the tin be removed entirely and a completely new built-up roofing applied.

In our judgment, which has been checked by two or three good roofers in this area, you are gambling when you try to cover the tin, especially if there is any traffic over the roof as decay has probably progressed to a point where mopped on felt will not arrest further deterioration, and you can expect the tin roof to practically fall apart even though it is protected from the atmosphere.

Some comments on a somewhat similar problem appear in the October, 1938, Problem Corner.

Value of Some Outside Air

American Artisan:

We have installed a great many forced warm air systems in old houses and have had some trouble with dirt. We have been told that due to the pressure built up inside the house by the blower there is infiltration and it has been recommended that a small outside air intake will help eliminate some of the dirt. We make sure that the furnace is tight and filters are clean so there is no dirt from the heating plant. What value has this outside air and will outside air eliminate this dirt trouble?

F. C. S., Ohio.

Reply by
The Editors

Regarding the question of dirt, it is our personal belief that some percentage of outside air, approximately ten percent, is advantageous, not only from the standpoint of reduced infiltration, but also because a small amount of outside air has a freshening influence on the air within the house.

The whole question of building up a slight pressure indoors is one of such minute comparative value that it is extremely difficult to visualize how this pressure can keep air from coming in through cracks around doors and windows. If there is no outside wind, it is possible to build up this slight inside pressure so that air flow tends to be out through the cracks rather than in. However, if there is a wind of more than four or five miles per hour velocity blowing against any one side or sides of a building, we doubt very much whether this inside pressure can be maintained.

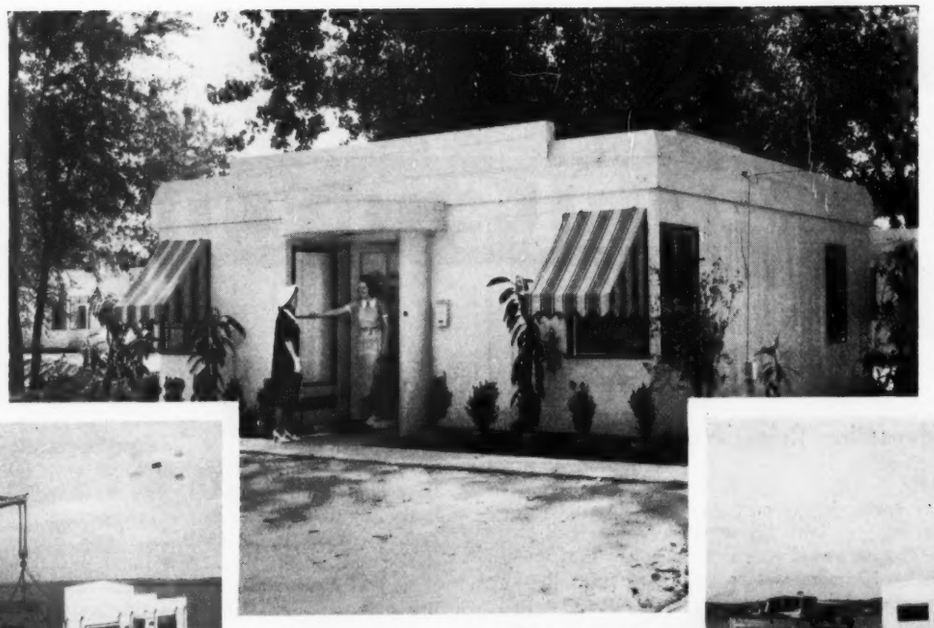
This question of dirt is not fully explained in your letter. We would like to know what kind of dirt it is, whether or not it seems to come from outside or perhaps from the basement or is it dirt that has been sticking in old stacks or register boxes or is it some light products of combustion or perhaps as one of our readers outlined in the problem corner of the April and March issues, and original in November, 1937, issue, it may be vagrant dirt from a fireplace, which is pretty hard to track down.

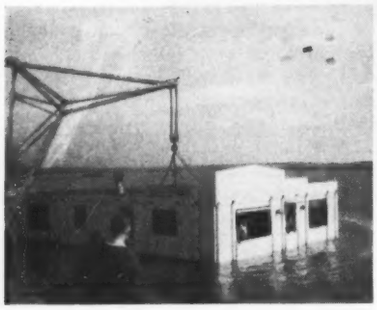
We are passing along to the research residence at Urbana your inquiry with the hope that Professor Konzo may be able to contribute some information of practical value.

Reply by
Professor S. Konzo,
University of Illinois

American Artisan has referred your letter of May 12 to me. It seems to me that they have answered your inquiry comprehensively and I am not able to suggest any other items that might enter into the problem. I am inclined to agree that the application of small amounts of outside air will not make an appreciable difference in this respect.

I would suggest, however, that the space between the stacks and the studding be completely filled at the basement ceiling in order to minimize the flow of air around the stacks. I believe it would also be advisable to use asbestos stripping on all of the joints on the suction side of the fan, particularly near the furnace.





Above—A steel house of the type described in this article. Left—The steel house launched in the Illinois River. Right—Steel house "at sea" being towed across the river.

A Steel House "Goes to Sea"

LAUNCHED at Peoria, Illinois, recently and towed across the Illinois River on its own bottom was the first residence ever to "sail" to its destination.

A 32 by 44-foot watertight, arc welded steel house, (See Fig. 1), fully equipped with furnace, stoker, cooling system, laundry, plumbing—even partially furnished—was dropped "overboard" by a crane, (See Fig. 2), from the yard of the R. C. LeTourneau factory and towed across the river by a tug, (See Fig. 3), to be placed on its permanent site on the Le Tourneau experimental farm.

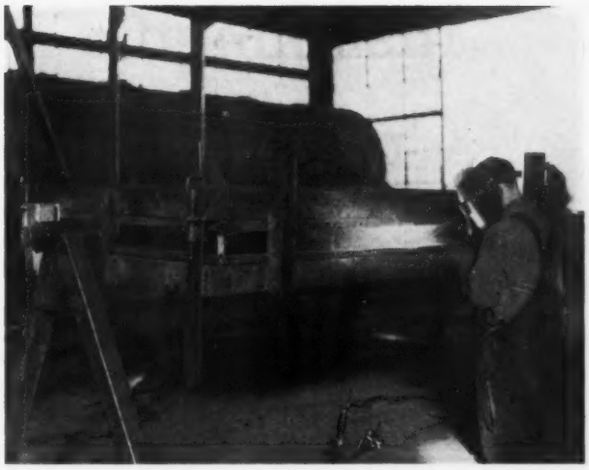
The house is constructed of solid steel completely arc welded into a watertight, weather-resisting, fire-, dust-, termite-proof dwelling. For the voyage across the river, the doors of the house were sealed to a height of 28 inches by means of steel plates and rubber gaskets. The house "drew" approximately 1 foot. After the maiden voyage, inspection showed showed an absolutely dry interior.

This "sea-going" house was built complete within the Le Tourneau factory. Its construction utilizes arc welded steel panels, (See Fig. 6), which comprise both walls and wall frame. The panels, which are pressed in a die to a form which enhances appearance and adds rigidity, consist of two 12-gauge sheets spaced approximately 5 inches apart for walls and 10 inches for roof, joined together by small braces as shown in Fig. 5. The space between the inner and outer plates is for insulating material which is blown into the panels at various intervals during erection.

Fabrication of a house panel is shown in Fig. 6. The two plates with flanged edges and the small spacer bars which maintain the inner space, are assembled in a fixture. The diagonal braces between

Fig. 5—Twelve gauge sheets are welded to stampings which form the wall shell providing space for fill insulation.

Fig. 6—Fabricating a wall panel in the special fixture which holds the plates while the spacers are welded into position.



the inner and outer plates are then placed in proper position and fused to the plates, forming an extremely rigid section.

The steel house was proposed and outlined by R. G. Le Tourneau, president of the company, and designed by an architect for providing employees with complete, convenient and attractive homes that could be rented or sold at moderate cost. The design embodies the latest, most modern trends in architecture . . . utilizing every foot of space and providing attractive rooms of generous size. In addition, these all-steel panel buildings have proved ideal as offices, filling stations and garages.

Arc Welding of Tantalum Sheets

(.005-in. Thick; $3.00 an ounce)

Tantalum sheets worth $50 a pound and so thin that it takes 200 of them to make an inch are now being arc welded regularly in the fabrication of chemical equipment.

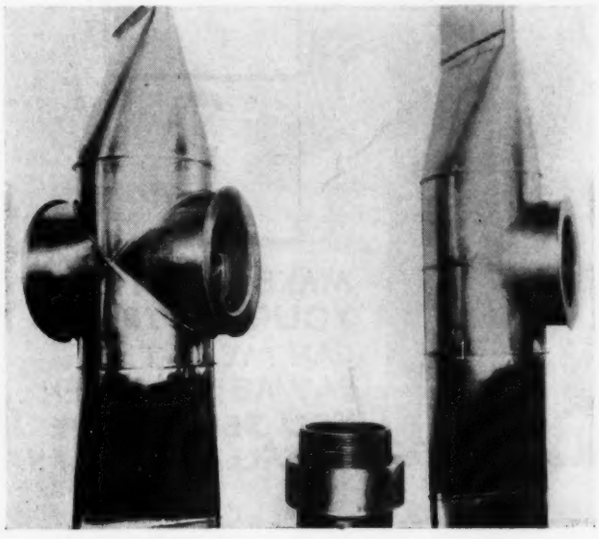
The metal tantalum possesses characteristics which make it especially valuable in the manufacture of all types of laboratory accessories. It is not tarnished by air nor attacked by acids, except hydrochloric. In tensile strength it is 2½ times stronger than platinum. It combines softness with workability and has great resistance to wet corrosion.

Tantalum is a rare metallic element found in association with niobium. Most of the supply comes from Australia, although it is found in the United States in small quantities in North Carolina, Colorado, and in the Black Hills of the Dakotas.

Methods Adopted

Exacting requirements covering the articles fabricated from tantalum have made it necessary to develop a special technique for welding it. Some of the factors which must be considered in working with this metal are as follows:

1. Tantalum is a very valuable metal, costing approximately $50 per pound—more than $3 an ounce.
2. Inasmuch as most of the articles are custom made, the labor cost is rather high. Spoilage must therefore be reduced to a minimum.
3. Finished welds must be strong, ductile and both gas and liquid tight under pressure and vacuum.
4. Tantalum cannot be deposited from an electrode without so embrittling the welds as to make them unusable.
5. Tantalum cannot be heated in air much above 650° Fahrenheit without becoming hard and brittle.
6. The melting point of tantalum is above 5100° Fahrenheit.



Arc Requirements

The method finally adopted consists of first forming a straight angle flange at all edges of the sheets to be arc welded. These flanges are then fitted together and tack welded in a few places to avoid shifting the assembly.

The job is then immersed in a tank filled with carbon tetrachloride so that the edge to be welded is approximately ¼-inch below the surface of the liquid.

Immersion in carbon tetrachloride requires higher voltage across the arc than would be needed to weld in air, and at the same time, the thinness of the stock being welded and the necessity for strict localization of the heat, demand low welding current. Hard carbon electrodes ⅛-inch in size, held in small light electrode holders, are used. The welding current must be of normal polarity.

Stability of the arc and ease of striking it as well as freedom from blowing are absolutely essential for producing good welds. An open circuit voltage of 50 which falls to about 25 across the arc usually produces satisfactory welds.

Current depends on the thickness of metal, .005-inch stock requiring only 15 amperes, and .025-inch 60 amperes.

Welding is accomplished by melting the edges of the flanges so that the metal runs together. This must be accomplished quickly since holding the arc in one spot or striking it more than once in one place, is likely to result in brittle welds.

Installment Credit Problems

By Wilford L. White

Chief, Marketing Research Division,
Bureau of Foreign and Domestic Commerce,
U. S. Department of Commerce

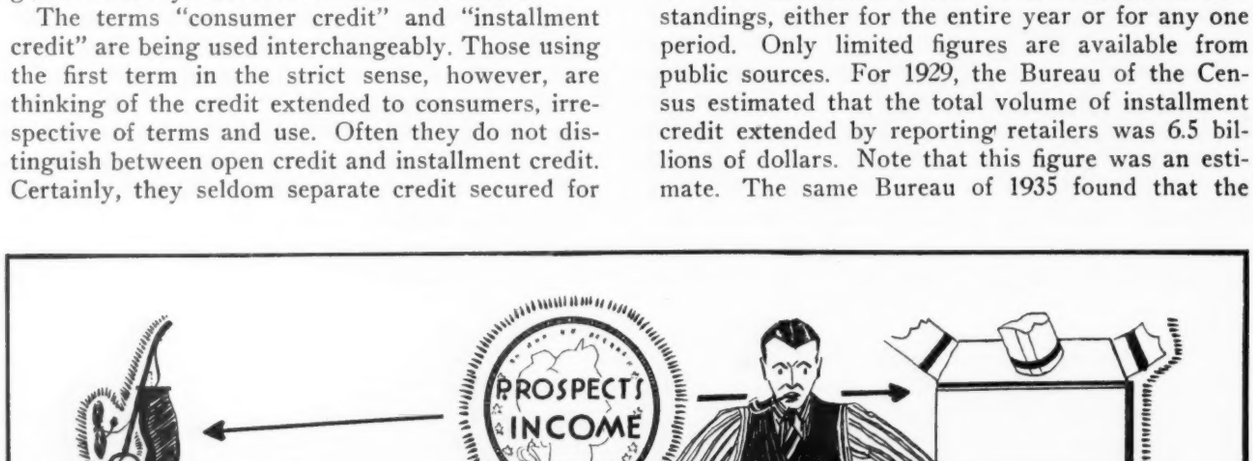
INSTALLMENT CREDIT, a selling device, has been used in the industrial marketing field for years. It met a need in buying residences and the more durable consumers' goods such as pianos and furniture many years ago. Not until automobile ownership began to be generally diffused, however, did the subject appear upon the economic horizon as something to be carefully watched. Today, it is one of the leading topics for conversation among bankers, industrialists, and distributors alike.

Some of the discussion is based upon fear, which, in turn, is based upon too little knowledge of the facts. For this tool of buying and selling, there is surprisingly little accurate factual information available to any one. Much confusion has resulted. Definitions have been ignored. Guesses have been given authority. Conferences have been held.

The terms "consumer credit" and "installment credit" are being used interchangeably. Those using the first term in the strict sense, however, are thinking of the credit extended to consumers, irrespective of terms and use. Often they do not distinguish between open credit and installment credit. Certainly, they seldom separate credit secured for the purchase of goods and services from that obtained to wipe out some other form of existing credit—the type often granted by small loan companies, industrial banks, and so on.

Those who talk about installment credit may include that granted to retailers, wholesalers, and manufacturers, as well as to the ultimate consumer. They are aware of the vast amount of credit extended for the purchase of industrial machinery and equipment, as well as for goods and services. We must, therefore, be cautious in accepting what we read or hear on this subject, until we know what limitations have been placed upon the data presented.

The figures quoted in this paper are based upon installment credit extended *by* retailers of goods and services. They represent the value of the goods sold on this basis and not the net amount of outstandings, either for the entire year or for any one period. Only limited figures are available from public sources. For 1929, the Bureau of the Census estimated that the total volume of installment credit extended by reporting retailers was 6.5 billions of dollars. Note that this figure was an estimate. The same Bureau of 1935 found that the



total had fallen to 3.6 billions of dollars, as reported by the retailers themselves. The Bureau of Foreign and Domestic Commerce again estimated that installment credit sales of retailers in 1936 rose to 4.5 billions. This last estimate was based upon the 1935 Census figure and reports from approximately 2,000 credit granting retailers, recently released as the "Retail Credit Survey: 1936."

Considering the definition and other limitations, this figure is neither high nor alarming. While other agencies grant an unknown amount of credit for the cash purchase of commodities and services from retailers, the amount probably is not large, comparatively speaking. The question is not one of absolute amounts, however, but one of relative sums. Retail sales were lower in 1936 than in 1929. Possibly even more important, national income was also smaller in 1936 than in the last year before the depression.

Retail Sales and Income

Retail sales of 49 billions in 1929, amounted to 33 billions in 1935, and increased to 38 billions in 1936. Installment credit sales for these same years equalled the following proportions of total retail sales: 13, 11, and 12 per cent, respectively. In other words, installment sales declined more proportionately from 1929 to 1935 than did total retail sales, increased more rapidly from 1935 to 1936, but in 1936, still were lower proportionately than they were in 1929, although only by 1 point per cent.

During these same years, national income, as estimated annually by the Bureau of Foreign and Domestic Commerce declined from 81 billions in 1929 to 55 billions in 1935 and rose to 64 billions in 1936. The proportions of installment sales at retail to national income for these same three years are as follows: 8.0, 6.5, and 7.0 per cent respectively.

Another check upon this method of selling is to determine the rate of increase of installment sales as compared with open credit and cash sales. If the proportion of installment credit is not rising faster than retail sales, there should not be much reason for alarm on this one point. For a small sample of credit granting stores, 1935 dollar sales increased 8 per cent over the 1934 figure. Cash sales, however, increased 3 per cent, open credit sales 9, while installment sales increased 19 per cent over the same period.

For a slightly larger group of similar retail stores, dollar sales increased 15 per cent from 1935 to 1936. During this period cash sales increased 11 per cent, open credit sales increased 15 per cent, but installment sales moved up 25 per cent. In these figures we find the first evidence that this type of retail business is increasing faster than either of the other two and increased at a faster tempo during 1936 than during 1935.

All of the above facts concern conditions prior to January 1937. What has been going on since that time? No one knows with any degree of certainty, but there are several factors which many are watching very closely. The more important ones are: (1) character of merchandise sold on the installment plan, (2) amount of the down payment, (3) carrying charges, (4) length of contract, and (5) losses from bad debts.

Character of Merchandise Sold

Much concern is being expressed today over the character of the merchandise being sold on an installment basis. Many are talking about what will happen as the result of selling "soft" goods on the deferred payment plan. As a matter of fact, however, merchandise which cannot be easily repossessed has been sold on the deferred payment plan, 10-payment plan, budget plan, and under other intriguing titles for some time. Current concern has probably been brought about by the sudden realization of the real character of these plans, and the volume of business they presumably can produce. This concern has evidently been heightened by the tendency of department stores and mail order houses to extend this method of payment to everything in the store or catalog. During rising prices and rising incomes, repossessions are never an important problem. When prices and incomes flatten out or decline or when the adjustment between the two changes unfavorably for income, existing obligations, and continued selling of "soft" merchandise on installments will be of immediate concern. Little is known either about the extent of installment sales on non-durable goods or the volume of this type of business. Sample data for the United States should be collected.

Amount of the Down Payment

Another question for growing concern is the down payment. When installment selling was first introduced, the practice of retailers was to let the down payment equal the cost of the merchandise sold. This was later changed to require only a proportion sufficient to induce the purchaser to continue payments to avoid loss of the equity obtaned in the merchandise by the down payment. The amount in many instances now has dwindled to the vanishing point. Too many advertisements repeat "1 cent a day" or "No down payment," even where there is nothing to turn in. With rising values, this problem is of no grave concern. At the time prices turn down once again, the lack of an adequate down payment will be cause for concern. The time to anticipate this situation is now.

Carrying Charges

Another question of rising importance is carrying charges, the amount and the method of quoting them to the consumers. The consumer is neither a mathematician nor a student of commercial discounts. Since little effort has ever been made to explain what the rate of installment charge includes beyond interest, and that the rate of interest quoted is not the true rate, the consumer has come to feel that the real rates paid, especially on small

purchases, are exorbitant and unreasonable. As a substitute for an educational campaign, some industries have attempted to give the consumer a simplified explanation with the result that some feel that these statements may lead to erroneous conclusions.

Apparently this idea is held by the Federal Trade Commission, which secured stipulations from all but two important automobile manufacturers, in which they agreed to stop certain advertising involving the now well-known, so-called 6 percent financing advertising.

Length of Contract

One factor which has concerned many interested in this subject has been the lengthening terms granted consumers. It has been realized that terms have been extended from 12 to 18 months, then 24 and 36, with some agencies granting installment credit for as much as 60 months. It has been claimed by some that the lead was taken by certain governmental agencies who were primarily interested in stimulating buying of many kinds of consumers' durable goods during the early period of the depression. Whether this point of view is correct or not, some of these agencies are no longer in the market for loans of this character, with the result that this competitive factor, if ever present, is no longer of great concern. And, certainly, we are well beyond the depth of the depression.

On the longer contracts, some distributors feel that they make sufficient profit out of the terms to sell the merchandise almost on a cost basis. In fact, they talk about making two profits and their salespeople encourage long terms. Possibly because this type of business is somewhat new to them, they do not realize the increased risk which they assume, increased risk which will be much more apparent in a falling price market than now. A practical result is that consumers tend to shop around for terms, tend to buy where they find the terms which seem best to meet their needs.

It is heartening to learn that definite steps are today being taken to shorten terms. Through the efforts of such organizations as the National Association of Credit Men, the National Retail Credit Association, the Credit Management Division of the National Retail Dry Goods Association, and a growing number of others, the lengthening of terms seems to have been largely stopped; shorter terms have been adopted in some instances. More conservative terms and greater uniformity should result from such a concerted effort.

Losses from Bad Debts

Losses suffered as the result of improper extension of installment credit or as the result of unforseen factors at the time extension was made represent one measure of the present situation. According to the Retail Credit Survey, the ratio of bad debt losses to sales on the installment business of approximately 2,000 credit granting dealers declined from 1.5 per cent in 1935 to 1.2 per cent in 1936, a decrease of roughly 20 per cent. On the basis of 4.5 billions of estimated installment sales for 1936, however, this "cost" equals something more than 50 millions. This "cost" compares with one-half of 1 per cent for open credit and nothing, of course, for cash sales during the same period.

Conclusions

It appears, therefore, from the few general facts available that installment sales of retail stores up to January, 1937, had not reached alarming proportions although the annual rate of increase had been high for the two preceding years. In spite of the fact that this method of selling produces about 12 per cent of retail sales, or the equivalent of 7 per cent of our national income, we do not know what is going on currently—we have few current series which will give the business man an accurate view of conditions in time to take wise action.

In the light of the apparent rapid increase of retail sales made on the installment basis, critically to consider the extent of this type of business in the soft goods field seems wise. Installment sales of this character are not new but they have never before been so large.

Many retailers now offering "soft" goods or, for that matter, storewide selections on the installment plan, lack the experience gained by furniture retailers and automobile finance companies. They have expanded in this direction because of the apparent chance to expand sales without increasing expenses proportionately, because of low interest rates, or merly because competition "forced" them into it. Many of these retailers may be making a satisfactory net profit on this business. They may have overlooked, however, the question of risk, particularly the risks involved over a long period of time, including the time when prices are going down.

The Next "Zero Hour"

No one can predict with certainty when another peak will appear like the one now so clearly outlined in 1929. Theoretically, and if that month in the future could be determined well in advance, the retailer could and would adjust his installment policies as he approached the "zero hour." Since he cannot do this, the next best policy is gradually to shorten the length of his contracts, realizing that they should never outlast the repossession value of the merchandise sold and that during a period of declining prices, they should be as short as possible.

In order that the consumer may have the maximum opportunity to educate himself on the proper use of installment credit, all business men interested in using this method of selling should consider the avenues open to them for the proper education of themselves as well. No general educational campaign, however, will succeed until there is more standardization of the amount of the down

(*Continued on page 98*)

VOTE

VOTE

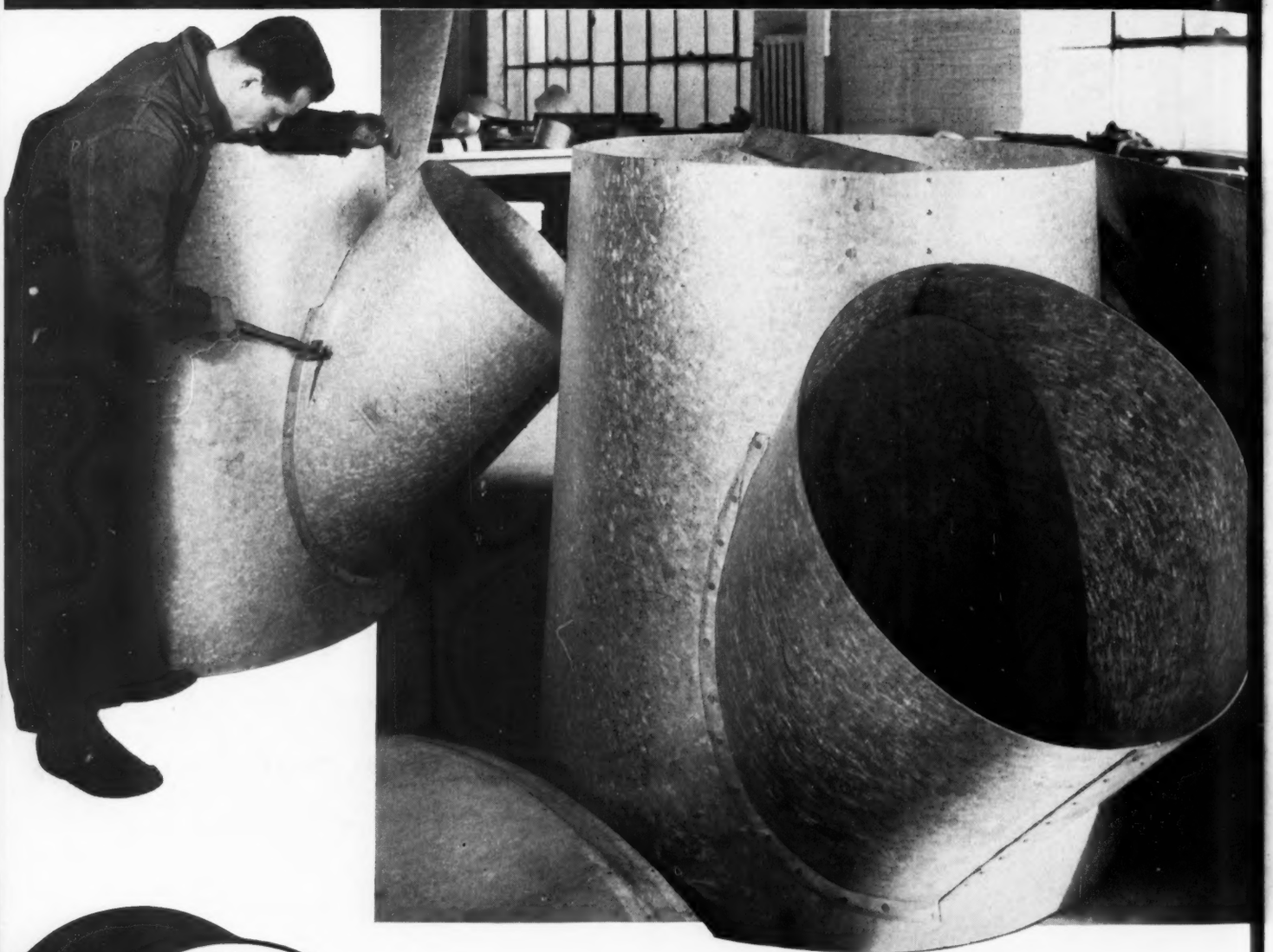
RESIDENTIAL AIR CONDITIONING SECTION

IT is with regret that we let another issue go to press without articles by G. A. Voorhees and S. Konzo. Mr. Voorhees' series on Precalculated Engineering had to be interrupted until he gets his head above water in assuming new managerial duties. He assures us that the articles will resume in January.

Professor Konzo has just finished writing the new book "Forced Air Heating," containing between stiff covers much of the material presented in his series in these pages. In January, also, he writes, a series on common problems of forced air heating installation (like cold floors, large glass areas, floor drafts, etc.) will begin again, if nothing interferes.

If you read the first article on Heat Conservation in Gas Heated Buildings in November, we ask you to read carefully the Editor's Note at the end of this second installment. It would seem as though insulation has a long way to go before all our thinking is correlated and agreed upon.

"I can bank on the job WHEN I USE SUPERIOR SHEETS"



"When I have SUPERIOR sheets to work with, it gives me confidence in my work. Jobs seem to shape up faster and truer. When the job is done I can bank on it being right."

After all, workability means everything in a sheet not only to the shopman but in the finished job as well. One secret of SUPERIOR workability is uniformity . . . of gauge, of coating, of temper . . . a straight line that marks the shortest route from plan to product. To enjoy the economies of this short-cut, use SUPERIOR COATED sheets.

THE SUPERIOR SHEET STEEL COMPANY
CANTON, OHIO
DIVISION OF CONTINENTAL STEEL CORPORATION, U. S. A.

THE SUPERIOR SHEET STEEL CO. TRADE MARK S REGISTERED CANTON, O.

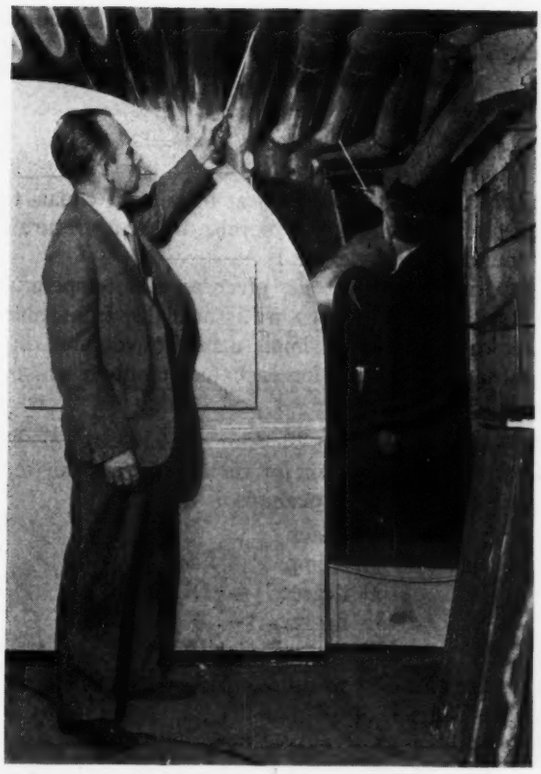
***SUPERIOR GALVANIZED** steel sheets are rolled from bars of special-analysis open-hearth steel, correctly tempered for shop work, and evenly coated with zinc by the **SUPERIOR** process.*

SUPERIOR
OPEN HEARTH STEEL SHEETS

SUPERIOR GALVANNEALED
"SUPER-METAL"
SPECIAL COATED

GALVANIZED SHEETS
GALVANIZED ROOFING
LONG TERNES

HOT ROLLED ANNEALED
PICKLED and
DEOXIDIZED SHEETS



Temperature Drop

A neglected factor which should not be overlooked or slighted

By B. L. Schwartz
Pittsburgh, Pa.

FOR the purpose of this discussion, let us visualize a customary winter air conditioning system which includes a heater, blower, filters, automatic humidifier, supply and return ducts, etc. Let us assume further that the heat losses for the various rooms have been properly calculated and that the plant has been laid out in accordance with the methods being used by many of the capable heating contractors of our district (Pittsburgh).

In most cases, this analysis will refer to new homes wherein few restrictions are placed on such designs, duct sizes, etc., as are specified by the respective designers. On the whole, these jobs have adequate supply and return grills; the installations are done in a neat and workmanlike manner. The heating contractor now walks away from the job, sends his invoice to the builder, receives his money (after the customary waiting period) and then may or may not see the job again.

In due time the house is sold and the new owner moves in. It may be during the spring, summer or early fall months when the heating plant is not in operation. Ultimately, however, old man winter sticks his nose into the picture and Mr. Home Owner finds he must light the furnace. He calls the gas company (many of Pittsburgh jobs use gas fuel) or calls the building contractor from whom he purchased his home; and the plant is placed in operation. Up to this point the procedure has been according to Hoyle and is satisfactory to all concerned.

Comes now the colder weather and with it more continuous operation of the heating system. Somehow or other something seems to be wrong; so Mr. Home Owner grabs the phone and again calls for service. In many cases, the gas companies have adopted a policy of having fullfilled their service if the unit is operating and gas is being supplied to the heater. The builder cannot help much (he is not a heating man) and the heating contractor having completed his end of the job is often very reluctant about doing any more; particularly if the system is working.

What to do? Only one thing left. Look at the nameplate on the heating unit and call the manufacturer or his representative. So in such an innocent manner are we introduced into the picture.

We check the operation of the equipment and make such adjustments as may be necessary. This may include such items as adjusting blower "on and off" differentials (frequently set for too great a variation between the blower on and blower off cycles), check the gas input with respect to the Btu content for each local condition, direction of blower rotation (occasionally found running backwards), belt tension, air flow volume, register temperatures, etc.

Balancing Room Temperatures

All variables having been checked or adjusted, we then begin balancing air flows in accordance with room temperature requirements. A very practical method is to place calibrated thermometers in all the key rooms and take velocity readings at the supply registers by means of an anemometer. Note the temperature reading (first making sure that the thermometers are in representative locations in the various rooms; that is, about 4 to 5 feet above the floor; not in close proximity to the heated air supply; and preferably in a location where the home occupants are apt to sit most of the time).

Compare the variation (over or under) from the average temperature for the house; and increase or decrease the air flow to each room as the actual temperatures vary from the average. After a fairly close adjustment has been accomplished (one degee plus or minus from the average is satisfactory), a final set of velocity readings should be taken.

It is this last set of velocity readings which usually shows an interesting situation. With rooms of approximately equal heat loss the air velocities may be found to vary greatly from each other. It is not unusual to find some velocities twice or even three times that of others for apparently similar requirements. It will also be found that the farther the room is from the heater location, the higher will be the air velocity required; and conversely, the closer the register to the heater, the lower the velocity will be. In fact, rooms less than 10 feet from the heater (if the house be from 60 to 100 feet in length) may have air velocities lower than 100 feet per minute; while similar rooms at the other end of the building will require air velocities of 300 fpm or more.

The reason for this situation is obvious. It is caused by the temperature drop of the supply air from the point at which it leaves the heater to the outlet register. Our "Code for the Design and Installation of Mechanical Warm Air Heating Systems" specifically states how this temperature drop should be accounted for. All other authorities advocate the same procedure; although the values used may differ.

For instance, the Code provides for an assumed drop of ¼ of 1 degree per foot of duct. Seichi Konzo, as reported in his series of articles in AMERICAN ARTISAN, found in his investigation work in the Research Residence at the University of Illinois that this loss ranges from .4 to .6 degree per foot. Whether we use ¼ or .6 degree per foot, a definite, specific loss does occur and should enter into the duct calculations.

Now just how much does this factor enter into consideration and what effect will its neglect or ommission have on the result? I have taken several sets of representative readings which indicate a temperature drop of approximately ½ of one degree per foot of duct length. This is also the same figure which Mr. Konzo recommends be used for this purpose.

Let us now assume three rooms of equal heat loss (10,000 Btu's each) and located as indicated in Fig. 1.

If we use an *average* register temperature of 135 degrees, this will be the temperature at station "B"; since "B" is halfway between the heater and the most distant register (C). The temperature at station "A" will be 135 plus $\frac{50}{2}$ or 160 degrees. The temperature at station "C" will be 135 minus $\frac{50}{2}$ or 110 degrees.

The cfm requirement for each station (at a uniform velocity) is determined as follows:

$$\text{cfm} = \frac{\text{Heat Loss from Room (H)}}{60 \times .24 \times \text{density} \times (T_{reg}\text{-}T_{ret})\ \text{(at reg.)}} \quad \ldots\ldots (1)$$

Where .24 is the specific heat of air and equals the fraction of a Btu required to raise the temperature of one pound of air 1 degree F.

The density of air at any given register temperature and fixed barometric pressure is available from tables. Therefore it becomes a simple matter to combine these variables into a factor for each temperature; and our equation becomes

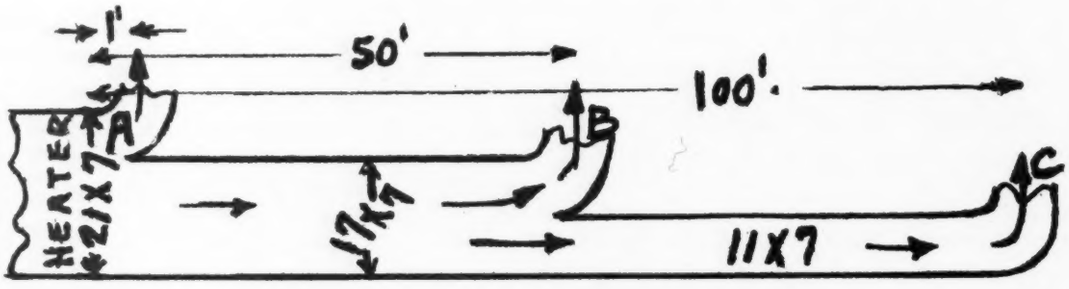
$$\text{Cfm} = \text{factor} \times \text{H} \quad \ldots\ldots (2)$$

The value of the factor for each of the register temperatures used in our example is as follows:

Register Air Temp.	Factor
160 degrees —	.0114
135 degrees —	.0149
110 degrees —	.0221

The cfm and duct areas required (in square inches) will then be

Station	Btu	Factor	cfm	Area
A —	10,000 ×	.0114	= 114	= 41 sq. in.
B —	10,000 ×	.0149	= 149	= 54 sq. in.
C —	10,000 ×	.0221	= 221	= 79 sq. in.



These duct areas are for a uniform velocity of 400 fpm; and are derived from the following equation:

$$\text{Area (sq. ft.)} = \frac{\text{cfm}}{\text{fpm}}$$

And for the velocity of 400 fpm assumed this becomes:

$$\text{Area (sq. in.)} = \frac{\text{cfm} \times 144}{400} = .36 \times \text{cfm}$$

It thus becomes very evident that this temperature drop cannot be neglected. A canvass of a number of the better known heating men in our district shows a uniform tendency to neglect this factor in figuring their duct sizes; although most of them seem to be aware of it. They depend on dampering the shorter runs to compensate for the higher register temperatures.

The writer believes this to be all wrong. Let us consider our example duct job. If all these ducts are 54 sq. in. in area and dampering is resorted to in order

to compensate for the temperature drops, the corresponding lineal velocities will be:

$$\text{Station A} = \frac{114 \times 144}{54} = 300 \text{ fpm}$$

$$\text{Station B} = \frac{149 \times 144}{54} = 400 \text{ fpm}$$

$$\text{Station C} = \frac{221 \times 144}{54} = 590 \text{ fpm}$$

Cutting down the velocity at Station A from 400 fpm to 300 fpm introduces no particular difficulty; but a register velocity at Station "C" of 590 fpm is objectionable. Furthermore, the difficulty of balancing is greatly increased, as one must then be guided entirely by the thermometer readings in the various rooms. On the other hand, if correct duct sizes were used throughout, one could go around with an anemometer and adjust the air flows to approximately 400 fpm all over; and have the job practically correct without the laborious and lengthy procedure otherwise required.

There is also a probable saving to be accomplished on most jobs on installation costs. The ducts and register sizes are reduced in more runs than will have to be increased in the distant runs. This is true since the heater is usually placed in as central a location as possible; and the number of short runs will be numerically greater (but physically smaller) than the fewer distant runs.

Consider for example our theoretical duct job. If all the stations are figured at 54 sq. in. area each, two stud spaces will be required for each station as a 3½ x 12 stack carries but 42 sq. in. as a maximum. If correctly figured, but *one* stud space will be needed for station "A"; and the same two stud spaces are all that will be required for the larger size at station "C" (79 sq. in.). It is thus evident that we can profit to an appreciable degree if we will spend a little more time in figuring duct sizes correctly before the job is installed instead of depending on dampers to correct for an ommission in calculation.

It has become pretty well established, that the Btu method of calculation for heat loss is the only dependable method. Short cuts, formulas, etc., have also been advanced rather freely; but the objection to these lies in the fact that they lose track of the basic fundamental idea of Btu requirements. It is not uncommon, in discussing duct sizes with some installers to find them utterly lost when Btu's are mentioned. Such terms as "room basic factor" or "house basic factor" cannot be translated by them into Btu's, although they are of course derived from this fundamental basis.

A simple method for quickly determining duct sizes after the Btu's for the various rooms have been determined, is to divide the separate heat losses by the heat carrying capacity per square inch for the room register temperature as estimated. A uniform lineal duct velocity must first be assumed.

The equation for this value is derived from basic equation (1); where

$$\text{cfm} = \frac{\text{Heat Loss from Room (H)}}{60 \times .24 \times \text{density} \times (T_{reg} - T_{ret})}$$

$$= H \times \text{factor (at reg.)}$$

and H (heat capacity in Btu's per sq. *inch*) $= \frac{\text{fpm}}{144 \times \text{factor}}$

The following table of values shows Btu's per sq. in. for ducts with lineal velocities of 300, 400, 500 and 600 fpm. Other values may be secured by proper substitution.

Reg. Temp.	Factor	Btu's per square inch. (Duct vel. in feet per min.) 300	400	500	600
90	.0384	54	72	90	108
100	.0279	74	99	124	149
110	.0221	94	125	157	188
120	.0184	112	151	188	225
130	.0159	131	173	216	261
140	.0140	148	198	248	297
150	.0125	166	222	277	333
160	.0114	182	244	305	365
170	.0105	198	264	330	396
180	.0097	215	286	358	430
190	.0091	229	304	372	457
200	.0085	245	325	408	490

The duct areas so far referred to mean branch take-offs in case of a trunk duct system or individual runs from the furnace. The basement trunk system proper can be figured on the junior code 10% reduction method as indicated on our simplified duct illustration or by one of several more exact methods.

Covers for Printing Press Rolls

(*Continued from page* 23)

oil. The ink fountains of the press unit are immediately below the ink rollers. By fitting the bottom of the pans over the opened ink fountain instead of closing it to the frame of the unit under the ink rollers, this problem was solved. The force of gravity brought the ink dripping down the sides of the pans back into the fountain.

The ink recovery characteristic of the ink roll hoods was not, at first, considered important by its creators, but the ink recovered has proved to be a practical factor.

Welding all joints instead of riveting made the ink returning to the fountains flow more freely. Welding, too, decreased the possibility of accidents to the pressmen, since there were no rivets on which they could cut or bruise their flesh in removing and replacing the covers.

Keeping the recovered ink free from oil was accomplished by the simple expedient of keeping all gears and other connections carrying machine oil, outside the covers. The illustrations of the rider roller unit shows how thoroughly this was done.

Fan-Furnace Heating in Central California

By W. W. Howe
Sausalito, Calif.

THE State of California runs from the forty-second parallel of latitude on the north to about 32.75 degrees on the south which gives the State a north to south range of some 750 miles with a width of about 200 miles. Just to give a comparison between the California cities and some of the larger Eastern cities:

	Degrees, North Latitude	Degree Days
St. Paul	45	7926
Boston	43	6045
Chicago	42	6290
New York City	41	5347
Washington, D. C.	38	4626
St. Louis	38	4585
San Francisco	37.75	3264
Oakland	37.75	3143
Los Angeles	34	1504
San Diego, Calif.	32.75	1645
Savannah, Ga.	32	1490

Two mountain ranges run through the State from north to south, the Coast range, not far from the Pacific Ocean and the Sierra Nevada range on the eastern side. This long north and south run of the State and the difference in altitude caused by the mountain ranges gives California a variety of climates. Sea coast towns do not vary a great deal winter or summer so far as climate is concerned, the inland valleys are hot during the summer months and moderately cold during the winter, while locations in the mountains have extremes of both heat and cold.

Just why so many of the older homes and business buildings in California were constructed without provision for comfort heating, other than fire-places, I cannot say. It may be that the early Californians were a hardy race and did not require the same amount of heat that we moderns insist upon. It may be that the climate is actually changing and that the winters are more severe than formerly. While this argument has been frequently advanced, the Weather Bureau records do not bear testimony in this direction. Whatever the reason, the fact remains that it is only within the past few years that some form of adequate comfort heating has been made a standard part of new construction in the home building field.

This condition presents the heating contractor with rather odd problems when attempting to incorporate satisfactory heating systems in these older buildings, originally constructed with absolutely no provisions for the installation of heating.

A typical instance would be this: The house has no basement, the floor of the house is some two feet above the ground line with frequent ventilating grills through the foundation walls so that the temperature under the floor of the house is the same as the temperature outdoors. There is no space in the house for a furnace or boiler and of course, no chimney to vent the appliance. A steam or hot water heating system could be installed, but the cost runs rather higher than the average home

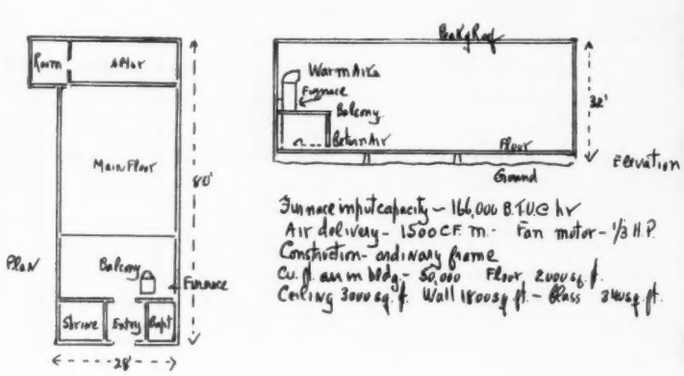


Fig. 1—Photo of furnace on balcony in St. Rita's church and sketch of layout. The system has to "blow" air 80 feet and prevent stratification from the high ceiling (32 ft.)

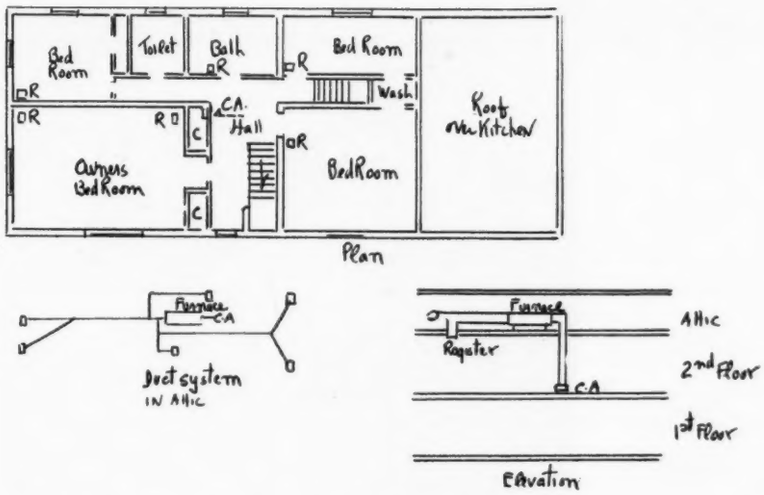


Fig. 2—This large residence in Ross, Cal. could not be torn up for second floor stacks, so a horizontal gas furnace was placed in the attic with piping as shown. Note cold air "suction" system.

◆

owner is willing to pay. It is in the solution of such problems that the fan-furnace system comes to the rescue of both heating contractor and home or business building owner. The furnace can be set on a back porch or in some closet on the same level as the floor of the house. The heating supply ducts are run either under the floor in the space between the ground and the floor joists with baseboard registers or in the attic space with ceiling registers.

St. Rita's Church Job

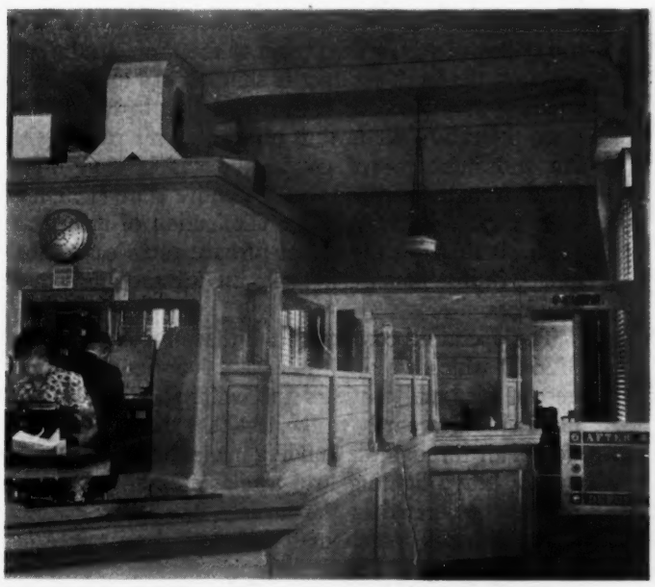
The sketch of St. Rita's Church, Fairfax, shows the solution of one such problem. This church has no basement. Permission was secured to use a portion of the balcony for the furnace location. As will be noted, the duct work consists of the duct taking return air from the floor level and an elbow at the top of the furnace which directs the flow of warm air to the far end of the church. This air throw is about 80 feet. The main body of the church is very comfortably heated throughout. Fan distribution of heat is the only possible solution for ceiling heights such as this, a thirty-two-foot peak.

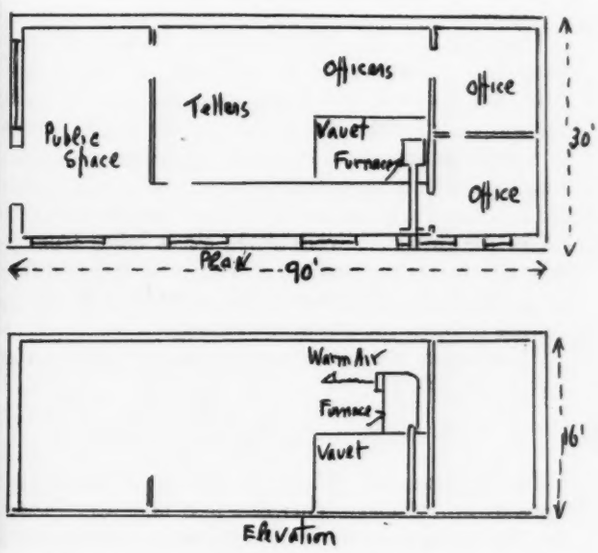
The heating installations described in this article are all located a few miles north of San Francisco and some fifteen to twenty miles inland. While very occasionally temperatures drop as low as 20 degrees above zero, our design temperatures are 70 degrees inside and 30 degrees outside. The degree day figure for an average year is 2750.

The fuel used is natural gas coming from what is known as the Rio Vista fields near Sacramento. Formerly, this territory was served with gas piped from the Kettleman field located near Los Angeles. The Rio Vista gas has a heat content of about 1040 Btu per cu. ft. and makes an ideal fuel mechanically while the rates at which it can be bought makes it a very economical fuel.

Residence with Furnace in Attic

Fig. 2 shows a large residence in Ross. This old mansion did have a basement and a few fireplaces on the first floor. However, the second floor had no provision for heating of any kind. To install a furnace in the basement meant tearing up elaborately decorated walls for ducts running to the second floor rooms. In this case the problem was solved very nicely by the installation of a gas-fired furnace in the attic space above the second floor with ceiling registers and a return air duct which ran down the wall of a closet and took air from the second floor level. We used a furnace built horizontally, that is, the cold air entered at one end of the





In this bank in Sebastopol there was no basement and the floor above was fully occupied. The furnace was placed on top of the vault as shown with outside air intake or recirculation as desired. The drawing shows the layout.

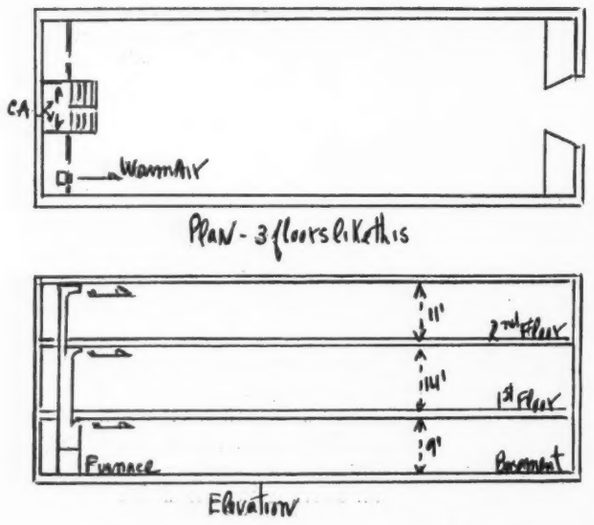
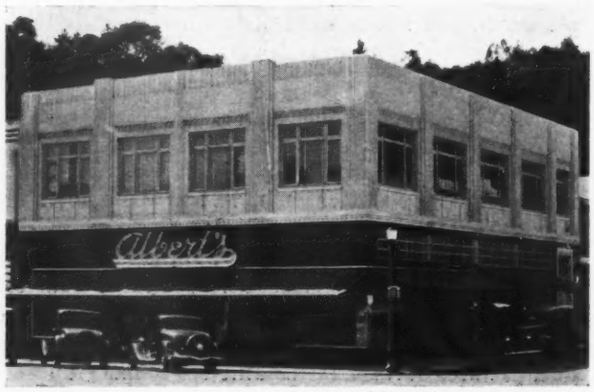


Fig. 3—Plan, photo of the furnace and exterior of the Albert department store, a new concrete building, where one riser straight up supplies one register for each floor. Recirculation is down the stairway.



furnace, passed through the fan and heating element and came out the far end of the furnace. This construction served for the limited head room in the attic space better than the standard upright furnace.

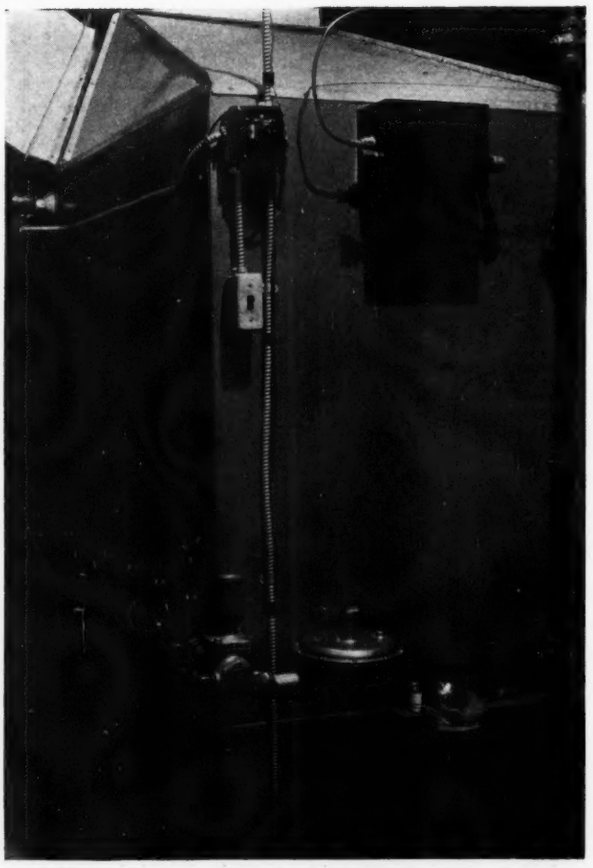
Bank with Furnace on Vault

Then we have the First National Bank building of Sebastopol. This was an old building with heavy stone walls, no basement and the second floor of the building was occupied by offices of other concerns. As can be seen from the sketch, space for a heater was hard to find but finally a fan-furnace was set on top of the bank vault. Warm air is delivered from an elbow at the top of the furnace. Recirculated air is taken from the floor line by a duct running down a side wall and fresh air is taken from a branch of the same duct which was carried through the top of a window.

This furnace used 79,400 cu. ft. of gas during a year, costing $61.00

Store Building—One Register to a Floor

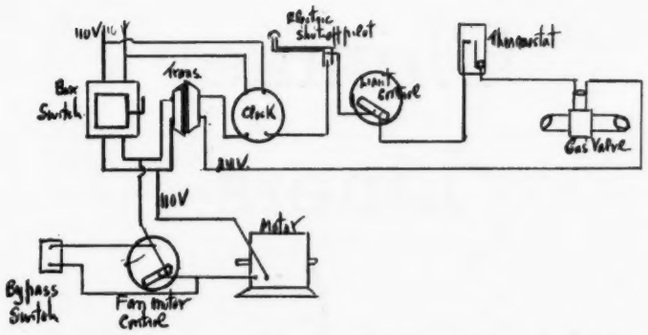
The next example (Fig. 3) is that of the Albert Dept. store in Mill Valley. This is a new and very modern building of concrete construction and the details of the heating system were carefully worked out before actual construction commenced. This installation is interesting because the heating of three floors from one warm



air register on each floor might seem unusual to those who think that an extensive system of duct work is necessary to distribute air and for the reason that the furnace room is used as a plenum chamber. Return air comes down a main stairway running from second floor to basement. Two return air grills are set in the side walls of the staircase at the first floor level and a duct carries the air to the wall of the furnace. A grill in the door of the furnace room allows return air from the basement to get into the furnace, across the floor of the furnace room. Then a 20 inch duct was carried from the ceiling of the furnace room to the roof. In the winter time, the fresh air duct is shut off and all of the air entering the furnace is recirculated air. In the summer time, the return air is shut off and all air entering the fan and furnace—(of course the gas is shut off)—comes from the roof, so that the entire store is supplied with ample ventilation. The elimination of return and fresh air ducts in the actual furnace room saved some money in installation and make the furnace much easier of access.

The operating cost for this furnace for one year was $136.00 which we think is a very low figure considering the size and usage of the building. This low cost for fuel is due partly to the fact that the rapid circulation of air through the building made the heat generated by the heavy lighting load available as an addition to the heat generated in the furnace itself.

The control system used for these fan-furnace systems is a simple two-wire circuit. As the gas valve is kept open for the flow of gas to the burner, a break in the circuit caused by movement of any of the controls shuts off the gas flow. Current failure at power house



Common wiring diagram for control of these California fan-furnace systems.

of course shuts down the gas flow which is automatically started again when the failure is corrected. The first fan furnaces received came with the controls supplied by the factory but the contractor had to do all the wiring. Late models are now arriving where all controls are connected to a panel built into the furnace and the contractor has merely to set his thermostat and connect to wires to outlet provided and connect 110 volt supply to another provided outlet.

Library "Blow In" System

One more example. Fig. 4 is that of the Sonoma Public Library. This might be considered a little unusual because the entire heat supply is delivered through two 14 x 30-inch grills immediately over the furnace, while the cold air is drawn from the far end of the building. The reason for this reversal of the usual idea was to avoid the heat loss in the long duct. With 40-degree air in the basement and 140-degree air in the duct, we have 100-degree differential while the cold air in the duct at 65 degrees would give a 25-degree differential. Hence the heat saved would be 75% by using return air through the duct instead of warm air. The design data on this job is:

Cu. ft. air in bldg. 21,200..Heat loss (infiltration)	42,400
Net wall	36,839
Glass	18,362
Floor	10,281
Ceiling	19,353
Total	127,236

Design temp.—70 inside—20 outside—Register air 140 degrees—Return air 65 degrees. Heat required 18 BTU per lb. air.

127,236 divided by 18 equals 7100 lbs. air per hr.
Vol. of 1 lb. at 140 degrees 15.10 cu. ft.
Vol. of 1 lb. at 65 degrees 13.21 cu. ft.
Air through register 107,210 C. F./hr.
Air through duct 93,791 C. F./hr.
Furnace input at 75% efficiency—169,000 Btu.

"Five-Point" A. C. Systems

Practically all California fan-furnace systems are equipped with filters and many of them have water pans located in the bonnet of the furnace. Some few have humidistats for accurate humidity conditions. A complete air conditioning system should be capable of heating, cooling, humidifying, dehumidifying, filtering and mechanically circulating; six functions. The systems described will heat, filter, humidify, circulate air and provide partial summer cooling by the use of the fan to introduce a constant volume of fresh air but lack mechanical or refrigerator cooling. We call them—"Five Point Air Conditioning Systems." It is our opinion that this type of equipment gives the customer great value for his investment and that the heating contractor who figures his installations for ample fan and furnace capacity will have but little customer complaint and service to contend with.

Conclusions

We have found in actual practice that these ideas work out very satisfactorily:

1—Multiple cold air returns are not necessary. We think for example, that a cold air return from every room is a waste of money. We have many large residences served by only one cold air return located at the foot of the staircase.

2—Large rooms such as auditoriums, offices, etc., can be easily and well heated by warm air supply from

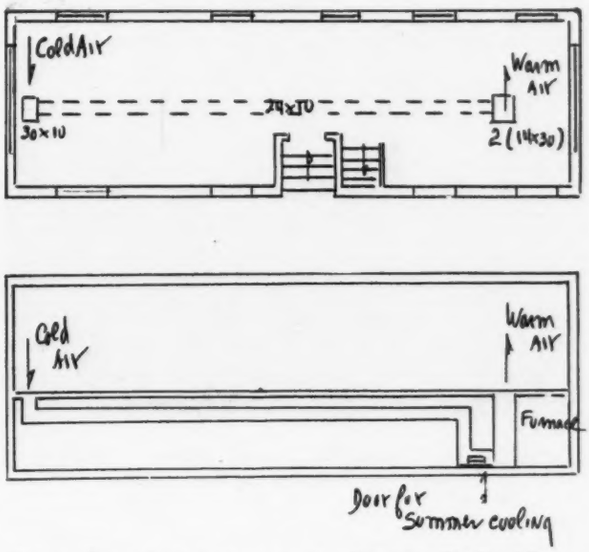


Fig. 4—Layout of system in the Sonoma Public Library where heat is delivered from the furnace top like a pipeless furnace and return air is brought from the far end of the room. The idea is to reduce temperature drop in a long pipe.

one grill. Extensive duct work for distribution of warm air in a space without partitions is unnecessary.

3—Warm air ducts and registers are figured for a velocity of 500 f.p.m. and cold air ducts and grills are figured for a velocity of 1000 f.p.m.

4—We do not attempt to design on static pressure basis except in very special cases.

I hope that at some time in the near future, a system of control will be placed on the market that will permit of continuous operation of the fan, possibly at a reduced speed when the house is at temperature and modulated control of the fuel, rather than the present all-off and all-on system. If the air supply could be delivered at, say, 130 degrees when heat is needed and at 70 degrees when the house is at temperature, with continuous air flow, I think the one weak point of the fan system would be eliminated. This weak point is the possibility of cold floors during the off period. Such a condition is emphasized by extreme weather and poor building construction.

Chimney Liners*

By Melvin C. Eck
Minneapolis Light Co.

Installing a liner in an old chimney. Photo by courtesy of Condensation Engineering Co., Chicago.

CONDENSATION in chimneys where gas is used as a fuel has long been a problem confronting the gas industry.

Some months ago a meeting was held by a group of men who were seeking a solution to their chimney problems. All present agreed that a decision should be reached relative to whether or not all chimneys should be lined, and what materials could be recommended as best suited for this purpose. A committee was formed, each member of which was charged with the responsibility of gathering certain data which could be discussed at later meetings.

A survey was made of thirty gas companies in the northern part of the United States, which represents a total of 94,000 gas burner installations. Of that number only 4.8 per cent of the chimneys have been lined with a liner expressly for gas fuel. From these figures the problem of condensation in chimneys appears to be a minor one, but the past heating season (1935-1936) has changed the viewpoint of many gas companies and the percentage of liners will rise sharply. Several of the largest gas companies in this area already have adopted a policy of lining the chimney in every case at the time of installation of the gas burner. They are also recommending a liner for the old installations at the first sign of trouble.

Causes of Condensation

Condensation will form in practically every chimney during the extreme cold weather; an outside chimney with three sides exposed is one extreme and an inside chimney extending through a heated attic is the other. There is no positive method by which even an experienced man can predict in every case whether or not a chimney is suitable for gas fuel. A severe winter will cause trouble that perhaps would not have been brought out in three or four normal winters. Many of the most flagrant cases of damages are due to faulty construction of the chimney, and could not be detected without a close examination. I have witnessed cases in which a contractor has skipped the tile lining near the top of the chimney for a distance of a foot or two just to eliminate the cutting of a tile for the short length needed. In most of the larger cities the building ordinance requires a fire clay flue liner on all new construction. This type of chimney is far superior to the brick and mortar chimney, but is not the answer to the problem, when gas is used for heating the home, due to the porosity of the tile and the leakage at the butt joint. The lifetime of this type of chimney is limited, and depends on the severity of the conditions it is exposed to.

Advantages of a Liner

Many advantages are derived from installing a properly sized flue liner at the time of the burner installation. Actual tests have shown the fuel economy to be as high as ten to fifteen percent in some cases, and in every case to be large enough to be noticed. Due to the lowered cross-sectional area, less air goes up the chimney, and consequently, less infiltration into the house. Basements are kept warmer, and draft conditions and "cold 70" are lessened on the first floor. Damage which may come

**Paper delivered at the Mid-West Gas School and Conference, Iowa State College, Ames, Iowa, November, 1936.*

to the chimney and walls is eliminated, and this cannot be measured in dollars and cents only.

Removing Condensation Spots

It is a serious problem when the chimney becomes saturated with condensation. A liner installed then will prevent further damage but it is already too late to eliminate all the trouble. A chemical analysis of the mortar from a chimney that had been torn down showed the presence of sulphuric acid and calcium sulphate. The sulphur in the coal used previous to the gas installation is largely responsible for the presence of these two compounds. Once the acid (being hygroscopic in nature) is carried through to the plaster, it will absorb moisture from the air on every humid day. The wall can be repapered, but the spots will appear again at a time of high humidity. There are two alternatives offered as a remedy to this condition, one being to remove the plaster and the other to treat the plaster to remove this moisture absorbing condition. One method of treating the plaster is with sodium silicate, which will neutralize the acid and harden the plaster. This method has been successful and has prevented the spots from appearing on the new paper.

Sizing Flues and Liners

The method used in the different cities for the sizing of flue liners is not consistent, and will vary from 5,000 Btu per square inch to 10,000 Btu per square inch. Another method is to install the largest liner possible. The figure most widely used is the one recommended by the A. G. A. which is 7,500 Btu per square inch. The company using 10,000 Btu per square inch bases its argument on the warm air heating code which states that the vertical stacks need be only 70 per cent of the basement warm air pipe area. Actual experience has proved this method to work out very successfully.

Water Heaters and Stoves

Storage water heaters and tank heaters can be vented into the chimney lining usually without any change in the sizing of the liner, but instantaneous water heaters must be taken into consideration. The gas input of an instantaneous water heater may be almost as high as the input of the gas burner and the sum of the two should be used when sizing the liner. Ranges on the first floor are usually vented into the chimney around the outside of the liner. When this is done the top of the chimney cannot be sealed up around the flue liner. When all the appliances are vented into the liner, the top can be sealed to form a so-called dead air space. The ideal cap for the top of the chimney is lead, but a Portland cement mixture is the one most commonly used, and then covered with a waterproofing material. One contractor in Chicago makes up a pre-cast concrete cap so that it can be installed even in the coldest of winter.

We have been talking about protecting the chimney by installing a liner to prevent the flue gases from coming in contact with the cold walls, but another angle is to keep the flue gases above the dew point to prevent the condensation. We cannot sacrifice efficiency by raising the stack temperature, but two other methods are available:

1. Lower the dew point.
2. Cut down the heat loss of the chimney.

Lowering the Dew Point

The dew point can be lowered by the addition of more air to the flue gases. By the addition of basement air, the temperature of the mixture is lowered more than the resulting lowering of the dew point, so nothing is gained. To cut the heat loss of the chimney will require insulation. A liner is dropped down the center of the flue and then an insulating material is packed between the liner and the chimney walls. This may be used on new installations, but should never be attempted on an old job in which the chimney walls are saturated with moisture. The insulating material will soak up the moisture, and the chimney being capped at the top will leave no way for the material to dry out.

The following data on materials used for flue liners is based on the reports from the different gas companies, and is their actual experience with about ten materials. There seems to be a difference of opinion on some of the materials, successful in one locality and condemned in another.

Copper

The results with copper were only fair, with only one company reporting having success with it and their experience was limited. One company reported using a heavy gauge copper and the liner was standing up well, but was starting to show definite signs of corrosion.

Lead Coated Pipe

Not recommended very highly by any one. Three or four years seems to be the lifetime from actual experience, but one company has estimated the lifetime as 8 to 10 years. The general opinion is that it will not stand up long enough to warrant its use.

Transite Pipe

Transite has been widely used, and the general opinion seems to be that it is very successful when properly installed. The most serious trouble experienced is leakage at the joints, but this is not a common fault. Transite is difficult to install due to the large outside diameter of the coupling compared with the inside diameter of the pipe. It cannot be used in an offset chimney, unless the chimney is opened up to install the offset fittings.

Aluminum

The proper grade of aluminum will stand up as far as condensation is concerned, but has not been

(*Continued on page* 56)

Heat Conservation in Gas Heated Buildings* [Part 2]

[See Editor's Note at End of Article for Profit Comment]

WE now approach what is probably considered by most heating authorities the most important of heat saving methods. The subject is a very broad one, for insulation is a term used to cover almost anything from one thickness of paper up to 6 inches of rock wool. In our discussions of the subject, we will confine ourselves to the more practical and usual applications met with in ordinary house construction. Our figures will again emphasize the fact that insulation is doubly valuable if its use is planned when the heating plant is figured so that it may not only save annual fuel cost, but it may pay for part of its own cost by reducing cost of the heating plant.

In the figures given as insulation in walls No. 1 and roof No. 1, we have assumed the material as a good grade of rock wool, placed in the walls and over the second floor ceiling 4 inches thick. We have assumed a cost of 12 cents per square foot if insulation is being done as the house is being built and of 16 cents if the insulation is blown in after the house is completed. We have used a conductance for the rock wool of .27 B.t.u.'s per square foot per degree difference for an inch thickness. Such insulation in our typical house gives us a saving on our maximum hour of 21% for the walls and 10.6% for the roof, with an annual fuel saving of 18.9 and 8.8 respectively of the total. The return on the investment. particularly if put in when the house is built, is very high. As a comparison, we show figures for the frequently used board insulation as plaster base.

In considering insulation, however, it is evident that there is some particular thickness that will give the most desirable results. We know that each additional inch of insulation saves less than the preceding inch. We will, certainly, come to some point beyond which it will not be wise to increase the thickness, because of the law of diminishing returns. As soon as this point is reached, we will not obtain sufficient saving to pay for the additional investment. This point will, of course, vary with the cost of fuel, the efficiency of the fuel, and the degree days for the locality. In order to illustrate this condition and if possible to determine the economic thickness for a given set of conditions, we have prepared the figures shown in Table "C." These figures show the first cost of rock wool insulation from 1 to 6 inches thick, together with the total heat loss, the saving in heat loss and fuel and the return on the investment for the various thicknesses. It is assumed that the insulation is added to a wall or roof having a conductance of .27 Btu's per square foot per degree difference per hour.

The figures show a return on the gross cost of 33.6 per cent for the 1-inch thickness and of 14.5 per cent for 6 inches. If, however, we analyze this further, we find that the investment in the second inch of insulation returns us 19 per cent on its cost over a 1-inch thickness. The gross investment in the third inch yields us 9.5 per cent on its cost over 2 inches of thickness, while the investment in the fourth inch pays us only 5.5 per cent over 3-inch thickness, and the saving of a 6-inch thickness over a 4-inch thickness will only yield 3.2 per cent return on the cost of the last two inches. We believe these figures are quite significant and that from them we might conclude that a 3-inch thickness of rock wool or its equivalent would be the most economical for the conditions we have assumed, since a return of 5.5 per cent, which is all we get from the fourth inch, is not particularly attractive. If money is worth 6 per cent, the return on the fourth inch is less than zero.

It will be remembered, however, that in many cases

TABLE C

SAVING DUE TO VARYING THICKNESS OF INSULATION
Added to Wall or Roof Having Conductance of .27 Insulation

Thickness of Insulation	*Loss per Day per Degree Therms*	*Cost of Insulation Dollars*	*Heat Loss Max. Hour Therms*	*Saving Max. Hour Therms*	*Saving per Day per Degree Therms*	*Saving Heating Plant Cost Dollars*	*Net Cost Insulation Dollars*	*Annual Operating Cost Dollars*	*Annual Operating Savings Dollars*	*Per Cent on Gross Cost Dollars*	*Per Cent on Net Cost Dollars*
None	.065	....	.189	...	...	.....	....	$43.00	.....	...	....
1"	.032	$ 64.00	.094	.095	.033	$45.00	$ 19.00	21.50	$21.50	33.6	113.
2"	.022	102.00	.063	1.26	.043	61.00	41.00	14.30	28.70	28.1	70.
3"	.016	140.00	.047	.142	.049	68.00	72.00	10.70	32.30	23.1	44.8
4"	.013	178.00	.038	.151	.052	72.00	106.00	8.60	34.40	19.3	32.4
6"	.009	255.00	.027	.162	.056	76.00	179.00	6.10	36.90	14.5	20.6

The calculations summarized in this table are based upon rock wool or equivalent insulation with a conductance of .27 Btu. per square foot per degree per hour for one inch thickness. 10 lbs. per cu ft., price $80.00 per ton; fuel 10 cents per therm; overall fuel efficiency 68 per cent; degree days 4,500, maximum hour is based on 0 to 70°; all figures are for 1,000 sq. ft. Labor and other expense of placing insulation has been taken at 3 cents per sq. ft. for 1" thickness and one-half cent added for each additional inch.

*Published as Interim Bulletin No. 26, by Commercial Section, American Gas Association, New York, N. Y.

the thickness of the insulation must be determined by other than purely economical considerations, as in many cases it is necessary to fill a given thickness or to spend more in confining it than the cost of filling the additional space. The savings of heat loss and fuel for various thicknesses of insulation for a locality having 4,500 degree days and fuel at 10 cents per therm, are graphically illustrated by the curves of Fig. 1. In Fig. 2 the variation of interest return on investment is shown for

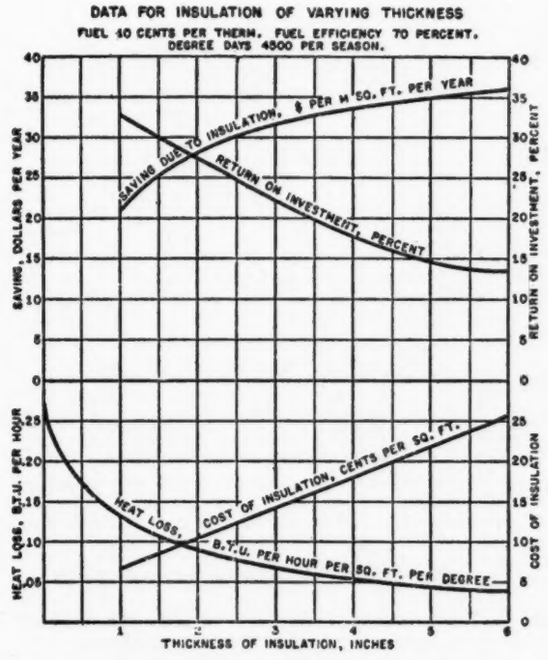

DATA FOR INSULATION OF VARYING THICKNESS
FUEL 10 CENTS PER THERM. FUEL EFFICIENCY 70 PERCENT.
DEGREE DAYS 4500 PER SEASON.
SAVING DUE TO INSULATION, $ PER M SQ. FT. PER YEAR
RETURN ON INVESTMENT, PERCENT
HEAT LOSS, B.T.U. PER HOUR PER SQ. FT. PER DEGREE
COST OF INSULATION, CENTS PER SQ. FT.
SAVING, DOLLARS PER YEAR
RETURN ON INVESTMENT, PERCENT
HEAT LOSS, B.T.U. PER HOUR
COST OF INSULATION
THICKNESS OF INSULATION, INCHES

Fig. 1—Chart showing savings effected by varying amounts of insulation.

a thickness of 4 inches in rock wool with varying costs of fuel and for different localities, varying from 3,000 to 8,000 degree days per season.

How to Choose Insulation

It must be realized that there are many factors to be considered in selecting the material for installation. The character of the house, construction, the facilities available for installation, the price of insulation at the time of installation—all must receive due attention. In dealing with the customer, we believe that it is important that he should not be allowed to expect too great a saving from insulation. The actual saving from properly installed insulation is enough to sell it. There has been, however, a tendency for some agencies selling insulation to promise more than they could perform. This has had a very bad effect.

The following data, collected by a large midwestern gas company, show savings that have been effected by the placing of 3 inches to 4 inches of good insulation in the ceilings or roofs of various types of residence buildings. The figures have been reduced to a degree day basis so that the two seasons may be truly comparable and, as far as possible, the figures are for periods of similar temperatures.

SAVINGS DUE TO INSULATION

Type of Building	*Number of Cases*	*Average Cost Gas Fuel— Before*	*After*	*% Saving*
Bungalows (Floored Attic)	16	$152.00	$121.00	21
Bungalows (Unfloored Attic)	7	124.00	97.00	21.4
Residences (Unfloored Attic)	18	174.00	145.00	16.6
Residences (Floored Attic)	3	200.00	173.00	13.5
2-Flats (With Central Heating Plants	50	286.00	228.00	20.3

Effect of Insulation on Summer Temperatures

While the effect of insulation on the summer temperature does not bear directly on gas heating, it requires our consideration, because its performance in keeping heat out would give some indication of its value for retaining heat in winter, and because the increased comfort that it would provide in summer is a very strong incentive toward its purchase.

We now have available the results of a study of the

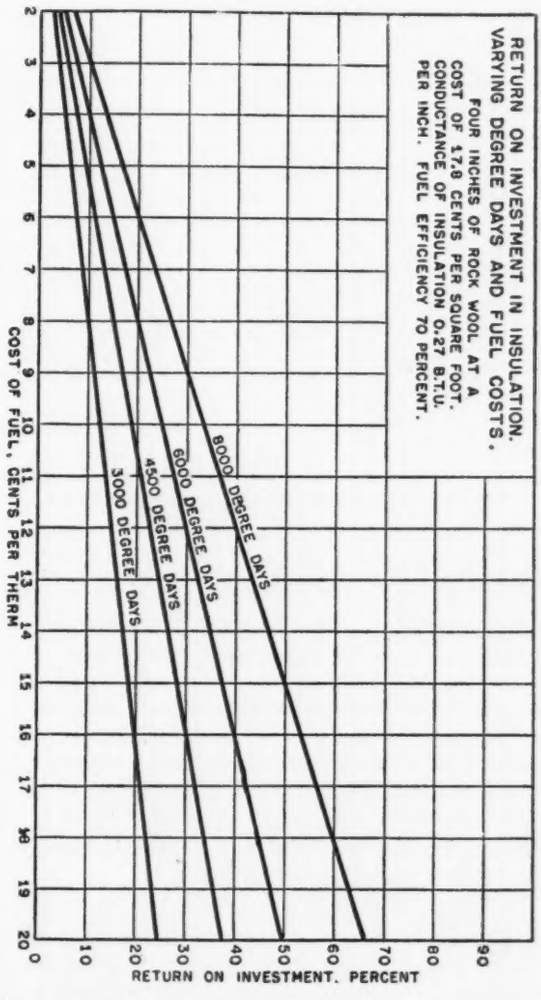

RETURN ON INVESTMENT IN INSULATION.
VARYING DEGREE DAYS AND FUEL COSTS.
FOUR INCHES OF ROCK WOOL AT A
COST OF 17.8 CENTS PER SQUARE FOOT.
CONDUCTANCE OF INSULATION 0.27 B.T.U.
PER INCH. FUEL EFFICIENCY 70 PERCENT.
8000 DEGREE DAYS
6000 DEGREE DAYS
4500 DEGREE DAYS
3000 DEGREE DAYS
COST OF FUEL, CENTS PER THERM
RETURN ON INVESTMENT, PERCENT

Fig. 2—Chart showing interest return on investment for 4 inches of insulation with different fuel costs.

effect of insulation on summer temperatures due to roof insulation in certain houses in Baltimore, which was carried out during the past summer. The houses were of the 2-story block type. Two methods were used to determine the practical value of insulation in such houses. In the first, recording thermometers were placed on the first and second floors of a house before the roof was insulated, and graphic records were obtained over a period before and after insulation, and compared with outdoor temperatures. In the second

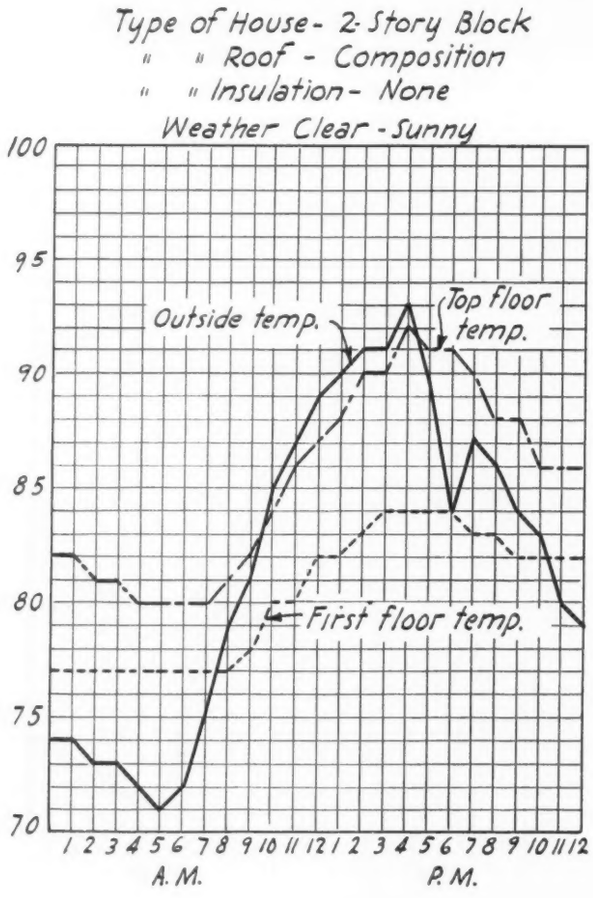


Fig. 3—Temperatures inside and outside for a house with no insulation as shown in the legend above.

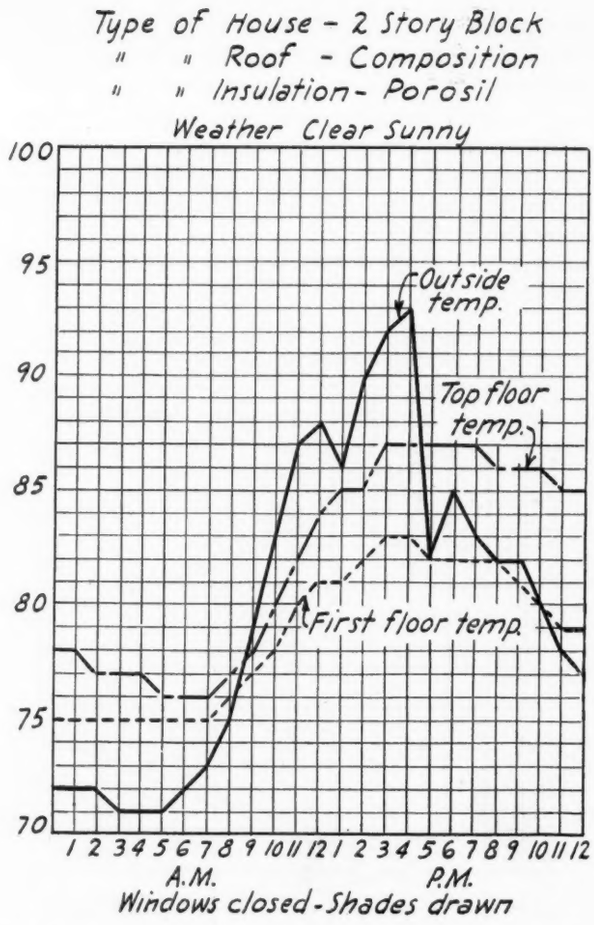


Fig. 4—Temperatures inside and outside for a house insulated as shown in the legend above.

method thermometers were placed in a house with insulated roof and in corresponding positions in an adjoining uninsulated house of identical construction and exposure. The first method gave comparisons on the same house for different days before and after installation. By the second we are able to compare results in exactly similar houses for the same day. In every case, occupants were instructed to keep their windows closed and their blinds drawn during the hot parts of the day. Experience shows that the manner in which the occupants handle their windows and blinds has a very large effect upon inside temperatures.

The curves shown in Figs. 3 and 4 illustrate and are typical of results obtained from the first of the methods just outlined; those of Figs. 5 and 6 are for the second. The study of these curves discloses a very satisfactory reduction in summer temperatures on the second floor of the buildings due to roof insulation.

General Features of Insulation

We believe that house insulation properly applied and, in particular, the insulation of roofs of 2-story residences and bungalows, secures at least four distinct benefits:

1. A fuel saving during the heating season that will return a handsome interest on the cost of insulation, which, in itself, would justify its installation.
2. A distinct addition to winter comfort by making it easier to maintain even temperatures throughout the house, eliminating drafts and overcoming the effects of insufficient radiation in parts of the house, particularly on second floors, which is so prevalent in the cheaper class of houses.
3. A substantial improvement in summer comfort.
4. A certain amount of fireproofing or fire retarding value. This, of course, applies particularly to insulators of non-combustible material.

We wish to point out a very pernicious practice which should be combated in every possible way, which is the custom of some builders to put in ½-inch thickness of board insulation and then in their selling talk to refer to the building as an insulated house. The layman who considers the purchase of the house does not inquire as to the thickness of insulation; he believes that he is purchasing an "insulated house," and is usually very much disappointed with the results as the thickness of insulation installed is inadequate to give an appreciable saving in his heating costs.

Loss from Open Fireplaces and Flues

Where a house has one or more open fireplaces not provided with some means of closing the flue when they are not in use, the loss of heat in the air flowing up the chimney presents a considerable and a preventable loss. The magnitude of this loss will depend upon and vary with a number of factors, many of which

are very difficult, or almost impossible, to determine accurately. The more important of these are the difference between the average indoor and outside temperatures during the heating season, the size and height of the chimney, the frictional resistance of the flue and the resistance to infiltration of air into the house.

The best data obtainable indicate that for the case of a chimney with inside flue dimensions of 8 by 12 and 30 feet high, in a house not weatherstripped, but with normally tight doors and windows, with a 20° difference between inside and outside temperatures (65° to 45°), the average velocity of air flow in the chimney is approximately 150 feet per minute. The volume is, therefore, 6,000 cubic feet per hour. Assuming a heating season of 210 days gives us a loss of 121 therms per season.

Assuming that the over-all efficiency of the heating plant for the season is 70 per cent and that 90 per cent of the loss up the chimney can be saved by closing the chimney when not in use, the preventable loss is 155.6 therms which, at 10 cents per therm, represents $15.56. The assumptions and values upon which these calculations are based are fairly conservative. Therefore, you may take this figure as about the minimum loss per open fireplace. In colder climates, and for higher and larger chimneys, it will be greater. In many of our older houses, particularly in the eastern part of the country, we find a number of fireplaces that are seldom or never used. When gas heat is sold, we should always point out to the owner the importance of closing these chimneys, if possible, with a tight fitting damper or some permanent method and see that this is actually done.

The flow of air from the cellar through the draft hood of the gas boiler or furnace and up the chimney may constitute a considerable heat loss. Since this air usually comes from immediately around the boiler, it is usually quite warm, and if the chimney is large and high, and drawing strongly, the loss will be distinctly worth considering. The simplest remedy is to provide a permanent fixed damper or restriction in the flue pipe between the draft hood and the chimney. In installing this, care must be taken to insure that enough opening is left to insure proper movement of the products of combustion under the worst draft conditions that may occur, and also that the damper is such that the size of the opening cannot be varied by the user. In addition to this very simple device, there are available automatic dampers which will completely close the flue when the gas is not burning.

Minor Heat Conservation Measures

The proper amount of insulation for boilers, furnaces, piping and heat ducts is a subject that must be largely referred to the judgment of the heating engineer who is familiar with the particular conditions in each

(*Continued on page* 94)

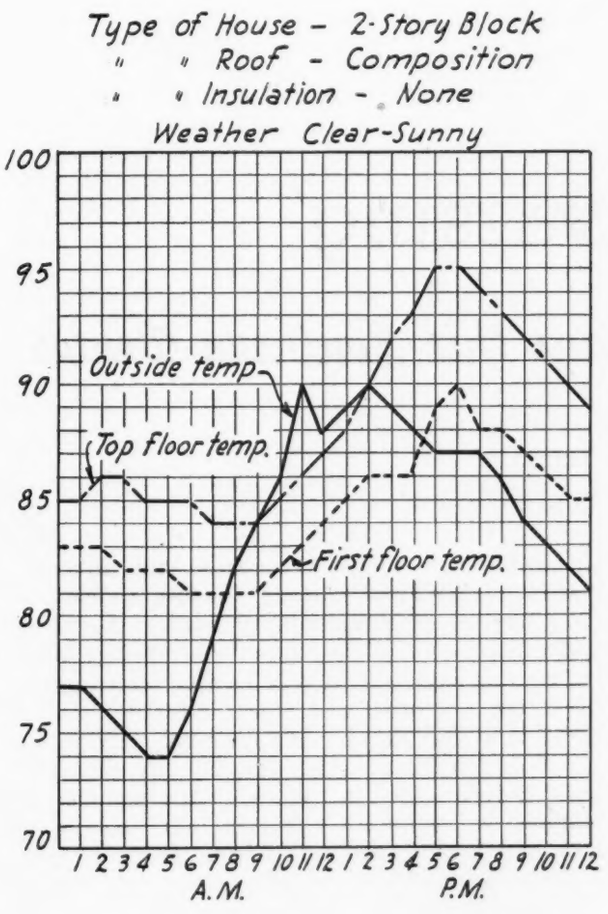


Fig. 5—Temperatures inside and outside for a two-story house without any insulation

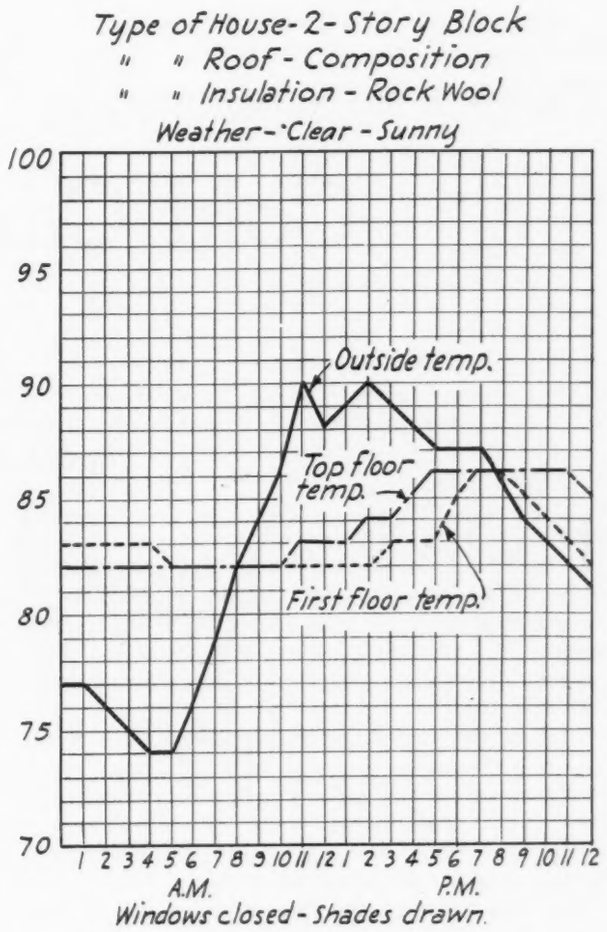


Fig. 6—Temperatures inside and outside for a house similar to Fig. 5, but with insulation

"There is No Substitute for

Cold Canvassing"

Says this Southern Dealer

By Geo. H. Watson

THE "Sales Mean Jobs" campaign was right in emphasizing "cold" canvassing as a producer of sales and a maker of jobs, according to the experience of L. E. Malone, president of the Standard Furnace & Air Conditioning Co., Inc., Birmingham, Ala.

Malone, a bonded heating engineer, has never found a substitute for door bell punching, which produces prospects for him when everything else fails. He makes use of an attractive showroom, utilizes direct mail matter and cultivates friends and acquaintances, but when all these fail to produce the week's quota of sales he and his salesmen start out calling on home owners.

Malone does not particularly try to sell winter air conditioning equipment on these calls, although that is his chief stock in trade. Rather, he features some services which most every home owner needs and which result in the sale of other things later.

These services consist of a furnace resetting job for $9.00, a furnace and stoker cleaning job for $7.00, or a soot cleaning job for $2.00. He gets a lot of this business, which keeps his service crew busy and on which he makes a little money. In addition, a lot of sales of parts and stokers, in fact, new heating systems, result. When he gets into the job and the owner sees the condition of the heating plant, the chances are then better for sales.

In addition to this approach to old property own-

ers, Mr. Malone sells many winter air conditioning installation for new homes in Birmingham by the same method of calling on people, first architects and contractors, and then the owners themselves before the heating contract is let. Malone said that the reason more people don't buy complete winter

Opposite—Exterior of Standard Furnace & Air Conditioning Co. with "giant" furnace which identifies store. Note pleasing show windows.

◆

Right—Special cleaning offer covering furnace and stoker and listing plainly the services included in the price.

◆

Below — Interior of show room showing a corner of register display board, furnace, stoker, night air cooling fan.

L. E. MALONE, PRES.

A. I. MALONE, VICE PRES.

STANDARD FURNACE & AIR CONDITIONING CO. Inc.

W. W. ESDALE, SECTY. & TREAS.

FURNACES
REPAIR WORK ON
ALL MAKES OF FURNACES

Bay Phone 2-1140
Night 2-3279
2842 South 18th Street
Homewood
Birmingham, Alabama

AIR CONDITIONING
ATTIC FANS
AUTOMATIC COAL STOKERS

May 12, 1938

Dear Sir:

SPECIAL OFFER ON CLEANING YOUR STOKER AND FURNACE
$15.00 VALUE FOR $7.00.

To introduce our new business that has recently opened at 2842 So. 18th Street, we will do the following work:

Clean coal out of hopper of stoker.
Paint inside of hopper with a special paint to prevent rust and decay.
Clean retort of stoker and feed conveyer.
Run sawdust treated with oil through conveyer, which prevents rust and corroding.
Clean wind box and oil motor.
Check all controls and do any minor adjustments necessary.
Clean furnace front and paint it with asphalt paint.
Clean smoke pipe and radiator of furnace.

The oil should be changed in a Stokol Stoker every two years and for a small additional sum we will wash and blow out transmission and refill with one gallon of genuine high grade Stokol transmission oil.

It is very necessary that the above work be done on furnaces and stokers in the Spring to preserve equipment through summer months. best on your stoker.

We are authorized Stokol Stoker Dealers and can serve you your service on any complicated problem that you may have in the future. Our mechanics are thoroughly experienced in both stokers and furnaces.

We have factory trained engineers that are at

We render this service to owners of all makes of stokers and furnaces.

REMEMBER! All of the above work done for $7.00, for a limited time only.

Yours very truly,
STANDARD FURNACE & AIR CONDITIONING CO.
By L. E. Malone
President.

LEM/wre

L. E. MALONE, BONDED HEATING ENGINEER

air conditioners in his area is that they don't know about it. Too many dealers, he said, are still interested in selling gravity systems, with no regard to modern automatic features.

"It makes no difference what a man is selling—he needs contacts and more contacts," said Mr. Malone. "That is why I am so strong for cold canvassing. My most successful salesmen are the ones who call on the most people. One of them went out the other day and by ringing door bells sold five furnace cleaning jobs, one furnace and a stoker. He has only average ability, but persistence plus.

"Of course I don't recommend cold canvassing if a dealer has all the business he can handle, but that is rare indeed, especially during the late spring and summer months. During these seasons we push attic ventilating systems and furnace cleaning jobs. This helps to make a 12-months-in-the-year business, although our specialty is warm air heat, used only in the winter time."

In canvassing, Malone and his staff take along advertising matter which is handed out. One of these pieces has a slit which fits over the door knob in case no one is at home. He leaves one of these at vacant houses also, as a bid for the business of the one who moves into the house.

Malone's place of business is located at a street intersection, and is marked by a furnace placed on top of the store, also by a bright awning which contains the name of the firm and products handled. Inside is a complete display of forced air heating systems, stokers, attic fans and the like. A particular feature is an attractive panel on which are mounted various types of registers, so they may be compared side by side. This has been found a distinct aid to the sale of better type registers. Also various automatic control devices are displayed effectively.

One method of advertising used by Mr. Malone is to erect an attractive sign at each place where an automatic heating system is being installed. It is headed, "We do it right."

Pattern Development for

Air Conditioning Fittings*

By William Neubecker
Head Instructor
Sheet Metal Department, New York Trade School

Transitions, Rectangular to Round

FIGURES 35 and 36 in the accompanying illustration show the method of solving transition problems by triangulation and covers two types of transitions.

Fig. 35 shows a plan and elevation of a fitting in which the round end is central under the rectangular end. Before laying out fittings of this kind, it is necessary that the areas of both the rectangular and round ends are equal. These areas are computed as follows: Assume that the rectangular end which connects to the riser or stack is 3.5 × 10 inches and it is desired to find the diameter of the round end. Multiply 3.5 by 10 and obtain 35. Divide 35 by the decimal .7854 and obtain 44.56. Extract the square root of 44.56 and obtain 6.67 or 6¾ inches as the desired diameter. Reduced to a formula, this is

$$\sqrt{\frac{35}{.7854}} = 6.67 \text{ or } 6\tfrac{3}{4} \text{ in.}$$

Computation can be avoided by using a table of circumferences and areas as follows: Knowing that 35 is the area of the rectangular stack, follow the column of areas to the nearest number 35.78 which suggests a 6¾ in. diameter. If the conditions were reversed and the diameter of the round end was given, whose area is 35.78 and the *depth* of the rectangular end was to be 3½ in.; then the *width* of the rectangle is found by dividing 35.78 by 3.5 and obtain 10.2 or 10 in. In other words,

$$\frac{32.78}{3.5} = 10.2$$

to find the *depth* when the *width* is given

$$\frac{35.78}{10} = 3.57 \text{ or } 3\tfrac{1}{2} \text{ inch}$$

So that the principles of the following development may be thoroughly understood, a complete plan and elevation has been drawn in Fig. 35. In practice when the round section of the transition is central over or under the rectangular section as shown in plan, it is only necessary to draw the *one quarter plan* as shown by *B*-5-*A*-1, because the four quarters are similar. The elevation shown above the plan is not at all necessary; all that is required is the *vertical height* of the transition.

Divide the one quarter circle in the quarter plan in equal divisions as shown by the figures 1 to 4. Mark the corner of the rectangle with the letter *A* and the center of the narrow side of the rectangle with the number 5. From the divisions 1-2-3 and 4 in the quadrant, draw lines to the corner *A*; also draw the seam line 4 to 5 and the line from the center point *B* to 1. These lines then represent the bases of triangles to be constructed whose altitudes will be equal to the desired height of the transition indicated by *A*-*A*° in the diagram of true lengths. At right angles to *A*-*A*° draw the line *A*-1 indefinitely.

Now measuring from the corner *A* in plan, take the various distances to 1-2-3 and 4 in the quarter circle and set them off on the line *A*-1 in the true lengths diagram, measuring in each instance from *A* and obtain the points 1 to 4. Take the distances in plan from 4 to 5 and *a* to 1 and set them off on the line *A*-1 in the true lengths from *A* to 5 and *A* to *a* respectively. From these various intersections on the line *a*-1 in the true lengths draw lines to the apex *A*°, which will give the true lengths of similar numbered lines in the one quarter plan.

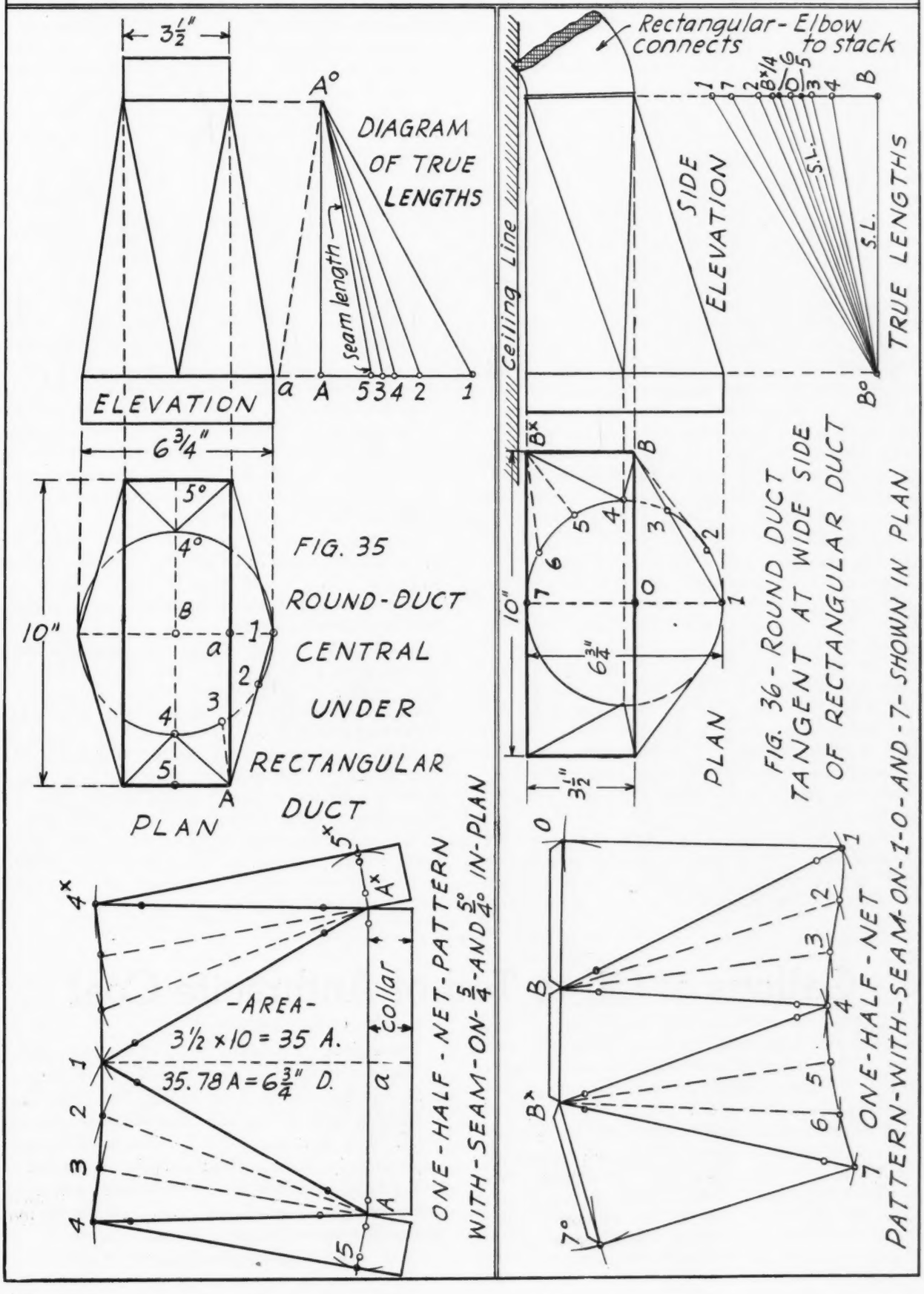
In practical shop work these true lengths can be laid off direct on the sheet metal and the one half pattern shape developed as follows: Take the length of *A*°-*a* in the true lengths and set it off on the line 1-*a* in the pattern below. At right angles to this line draw the line *a*-*A* equal to *a*-*A* in plan.

Draw a line from *A* to 1 in the pattern which will be equal to *A*°-1 in the true lengths. Now with radii equal to *A*°-2, 3 and 4 in the true lengths and using *A* in the pattern as center, draw short arcs near 2-3 and 4. Set the dividers equal to the distances 1 to 2 to 3 to 4 in the quarter plan and starting from point 1 in the pattern step to arc 2, 3 and 4 and draw a line from 4 to *A* and a curved line from 4 to 1.

With *A*-5 in plan as radius and *A* in pattern as center draw an arc near 5 and intersect it by an arc struck from 4 as center, with the seam length *A*°-5 in the true lengths as radius. Draw lines from 4 to 5 to *A* in the pattern. Then will 1-4-5-*A*-*a* be the one quarter pattern. Trace this quarter pattern opposite the center

*All rights reserved.

PATTERNS-FOR-TRANSITIONS-RECTANGULAR TO-ROUND SOLVED BY TRIANGULATION (I)



line 1-*a* to complete the half pattern shape as shown by *4-4*^{X}*-5*^{X}*-5*, with seam on *5-4* and *5°-4°* in plan. As *4-5-A* in plan is a right angle, then must *4-5-A* in pattern also be a right angle.

Fig. 36 shows another type of transition. In this case for want of space, the problem has been developed lengthwise of the page.

In this problem, as in the previous one, the full plan and elevation have been drawn. As before mentioned, the side elevation is not at all required; all that is necessary is the *horizontal length* of the transition shown by *B°-B* in the true lengths. As the round end, shown in plan, comes directly in the center of the rectangular end, but is tangent at *7*, it is only necessary to draw the half plan in practical work as indicated at the right.

Having drawn the half plan in its proper position as shown and knowing the horizontal length of the transition, finding the true lengths are next in order and are obtained as explained in the previous problem. Space the semi-circle in plan in equal divisions as shown from 1 to *7*. Letter the corners of the semi-rectangle, *B* and *B*^{X}. From points 1-*2-3* and *4* in the semi-circle draw lines to the corner *B*, and from points *4* to *7* draw lines to the corner *B*^{X}. Now draw any right angles below the side elevations as shown by 1-*B-B°*. Take the length of the lines *B*-1, *2*, *3* and *4* in plan and set them off on the line *B*-1 in the true lengths measuring in each instance from the corner *B* as shown by the figures 1-*2-3* and *4*.

In a similar manner take the length of the lines indicated in plan by *B*^{X}*-4*, *5*, *6* and *7* and set them off on the line *B*-1 in the true lengths, always measuring from the corner *B*, as shown by the figures *B*^{X}/$_{4}$, *5*, *6* and *7*. From these intersections on *B*-1 draw lines to the apex *B°* which will be the true lengths of similar numbered lines in the one half plan. As the seam of the transition will be at *7* and *O*-1 in plan, take the distance of *O*-1 and set it off in the true lengths from *B* to *O* and draw a line from *O* to *B°* marked S. L. (seam length). As the circle at *7* in plan is tangent to the rectangular side, then will the horizontal length *B-B°* in the true lengths be the length of this seam line, also marked *S. L.*

The pattern can now be laid out as follows: Take the distance of *B-B*^{X} in plan and set it off as shown by *B-B*^{X} in the pattern. Now with *B°-4* in the true lengths as radius and *B* in the pattern as center, draw a short arc near *4* and intersect it by an arc struck from *B*^{X} as center, with a radius equal to *B°-B*^{X}/$_{4}$ in the true lengths. Draw lines in pattern from *B*^{X} to *4* to *B*. Now with radii equal to *B°-3*, *2* and 1 in the true lengths, and using *B* in pattern as center draw short arcs near *3*, *2* and 1.

Set the dividers equal to the divisions between 1 and *4* in plan, and starting from *4* in the pattern step to arc *3-2* and 1 and draw a line from 1 to *B*. Take the distance *B-O* in plan as radius and with *B* in pattern as center draw an arc near *O* and intersect it by an arc struck from 1 as center, with radius equal to *B°-O* in the true lengths (marked S. L. seam length). Draw lines in pattern from *B* to *O* to 1. With radii equal to *B°-5*, *6* and *7* in true lengths and using *B*^{X} in pattern as center describe short arcs near *5-6* and *7*. Again set the dividers equal to the divisions between *4* and *7* in plan and starting at *4* in pattern, step to arc *5*, *6* and *7*.

Draw a line from *7* to *B*^{X} and trace the curved outline from *7* to 1. With *B*^{X}*-7* in plan as radius and *B*^{X} in pattern as center draw an arc near *7°* and intersect it by an arc struck from *7* as center with radius equal to *B°-B* in the true lengths (marked S. L. seam length). Draw lines from *B*^{X} to *7°* to *7* to complete the one half net pattern shape with seam on *7* and 1-*O* in plan. As *B-O*-1 in plan is a right angle then will *B-O*-1 in pattern also be a right angle. As the seam line at *7* in plan, will be at right angles to *7-B*^{X}, then will *7-7°-B*^{X} in pattern also be a right angle.

The ends of the pattern shapes should always be proven in this manner. A collar has been added to the pattern in Fig. 35. Care must be taken to notch out the corners at *A* and *A*^{X}, always at right angles to their respective sides as shown.

In the pattern shape in Fig. 36, edges have been allowed along *7°-O* to which the drive cleat is locked when joining to the rectangular elbow, partly shown above the side elevation. Allow a seaming edge along the curved outline in both patterns in Figs. 35 and 36 to which the round collars are seamed. The heavy dots in both patterns indicate where slight bends are made so as to separate the quarter conical corners from the flat surfaces. When forming up these conical corners in the brake care should be taken not to make sharp bends but have a *clean, smooth curved surface* similar to a quarter cone, joined to the flat surfaces of the rectangular end.

Gallons of Oil to Ton of Anthracite Coal

THE all-familiar question, "How many gallons of oil are required to replace a ton of Anthracite or a ton of Bituminous" has, in fact, enjoyed a myriad of widely divergent answers.

In an attempt at standardizaion and an effort to secure a truthful, indisputable basis for comparison, Anthracite Industries Laboratory recently sponsored an engineering meeting. As a result, it was decided, because Anthracite equipment had been so improved during the past few years, that the only fair basis of comparison should be made from a consideration of the heat value of the various fuels.

The engineers unanimously decided that any attempt to consider efficiency in comparing the fuels must include an actual survey of the heating plant rather than originating from a long-range generalization or guess work. They pointed out that a gallon of oil contains approximately 140,000 Btu's; similarly the Bureau of Mines furnishes figures of 26,600,000 heat units as being contained in a ton of Anthracite. A simple division shows that upon this basis of equal efficiencies, 190

(*Continued on page* 96)

Left—A check for oil fumes disclosed ¾-inch cracks around this clean-out door. Center—The author running a CO_2 test. Right—The flapper on this draft regulator had been removed; result no control of the draft and an opening for flue gases to escape into the basement.

Inspection Routine For Checking Oil Burner Jobs

By E. F. Fuller
Nashotah, Wis.

IN the class room, the future combustion and heating engineer is taught the theory of "Pyrometrics," "Flue Gas Analysis," the science of adjustment of oil, gas, or coal-fired equipment, air analysis, and other scientific and theoretical subjects.

The heating equipment used for laboratory tests is, for the most part, new, and the tests are customarily conducted under uniformly favorable conditions. But the post graduate course in the field of practical operations, in the average basement "laboratory," is quite different; as no two basements, or no two complete heating systems are exactly alike.

When we are "Trouble Shooting" in the field, one hundred and one things may account for imperfect, or complete failure of operation of the system, and the engineer in the basement must be trained to put his hand, almost by instinct, on the exact thing that has gone wrong. Ability to do this can be acquired only by years of practical experience.

For owner satisfaction, each piece of heating equipment should be carefully tested and the operation of the entire system should be periodically checked throughout the heating season. Engineers and mechanics engaged in testing and repairing combustion equipment, must be trained to realize the importance of their work, particularly as to the health and safety of the occupants of buildings.

When repairing the oil burner, gas burner, or stoker, the heating plant should also be gone over carefully. If the engineer or mechanic is not equipped to make furnace or boiler repairs, imperfections should be reported to be taken care of by others properly trained for this type of work.

Recently the writer was called in to analyze an oil heating system, in a basement that had been damaged by an oil burner fire at the end of the last heating season. The insurance adjuster had passed on the fire damage and claim; the oil burner repair man had repaired the burner; the insurance company had paid the claim, but at the opening of the present heating season, the tenants in the building smelled fuel oil gas, and called the owner who, in turn, called the writer.

The heating plant was a round, horizontal section, cast iron boiler, with clean out doors in each section. The writer found the frame of one clean out door had been very carelessly wired, (instead of being bolted), leaving a ¾-inch crack between boiler section and frame. A second door frame had one bolt missing and showed a ½-inch crack. The bricking in the combustion chamber showed a 1-inch hole below the blast tube of the oil burner and flapper at top of draft regulator was completely gone, leaving a 6-inch hole for stack gases to pass into the basement and on into the entire house. Had the lady of the house not smelled fuel oil gas and cut off the burner, there would undoubtedly have been another fire and perhaps an explosion that might have wrecked the building and resulted in unnecessary loss of life and property.

Scarcely a week passes during the winter months, that one does not read in the newspapers of one or two persons, and sometimes the entire family, being asphyxiated by coal gas from a leaky stove, furnace, or boiler, and a surprising number of buildings are burned every year as a result of faulty heating plants.

Suggested Checking Routine

In order to check an installation systematically, the following inspection routine is offered:

1. Inspect for sooty accumulations and thoroughly clean heating plant.
2. Inspect for large or visible leaks and cracks.
3. Burn tar paper, or other smelly and smoky material in fire box. Smell and look for leaks.
4. Pass flame of plumber's candle along all joints and seams and look for flame flicker indicating small leaks.
5. Check combustion chamber draft.
6. Check smoke pipe draft.
7. Adjust to Manufacturers' recommended draft.
8. If insufficient draft is indicated, check for "Common Chimney Faults.
   a. Top of chimney should be two feet or more above peak of roof.
   b. Trees near or above chimney must be trimmed or cut down.
   c. Chimney flue must be cleaned of all soot or other deposits.
   d. Tie a rope to, and lower a tile, or other weight, slightly smaller than cross section area of chimney flue, to find protruding joists, tile, or other obstructions that will check draft. In a vertical chimney flue without offsets, a mirror may be inserted in clean out door at a 45 degree angle, to detect obstructions in chimney. Remove all chimney obstructions.
   e. During smoke test, place a piece of sheet iron, or board, over chimney top for a short time, and inspect for chimney leaks between loose bricks or tile. Carefully patch all leaks.
   f. Close clean out door and patch leaks or loose fitting doors.
9. Allow only one smoke pipe connection to each chimney flue.

If the oil burner and stoker service men cooperate with the furnace repair men, and all work together with the heating engineer, a material saving can be accomplished in fuel combustion, explosions and fires resulting from faulty heating plants will soon be looked upon as a relic of the "horse and buggy days."

Chimney Liners (*Continued from page* 45)

satisfactory when installed in a chimney, due to the corrosive action on the outer surface of the metal. Some method of protecting the outer surface of the metal is required.

Vitreous Enamel Pipe

Of all the materials on the market the vitreous enamel pipe, at the present, seems to be the best answer for a chimney liner. It can be used in either straight or offset chimneys as the manufacturer makes the pipe in joints as short as six inches. With these short joints an offset can be handled with ease. The lifetime of this pipe is not known, but if handled with reasonable care, and the enamel not chipped off to expose the metal, it should well be worth the investment. An eight-inch liner of this type was installed in Minneapolis five years ago, in an outside chimney, and looks as good today as when it was installed. A "condensation eliminator" of the same material is put out by this manufacturer, the merits of which I know very little, except the claims made by the manufacturer.

Stainless Steel

The reports on 18-8 chrome nickel steel and Alleghany metal are very satisfactory. A few cases of corrosion have been found, but this particular company believes it to be a defect in the material and have not removed it from their approved list.

Spraying with A. C. E.

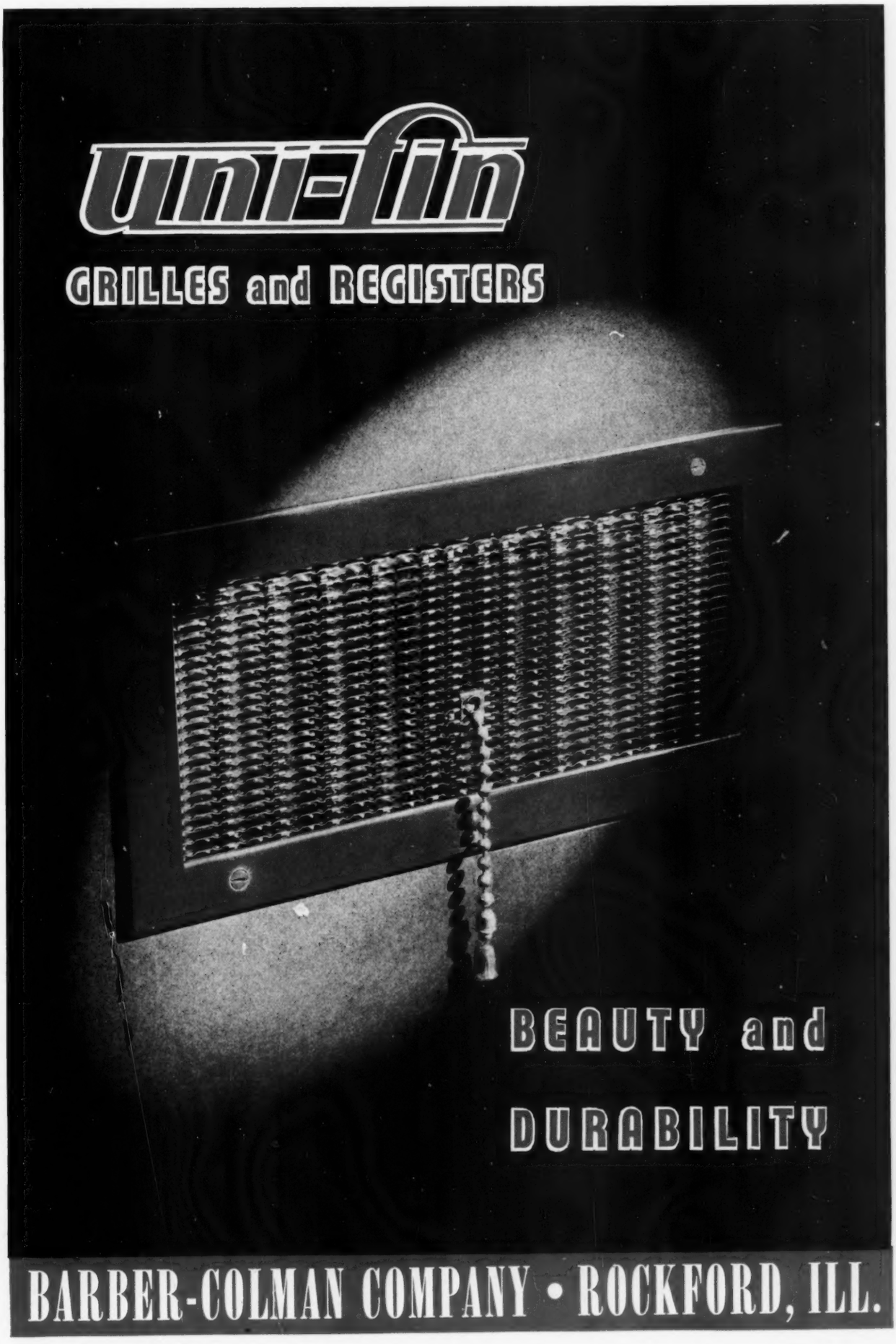
This method has not proved satisfactory because of the difficulty in getting a coating to cover the entire surface. Even when applied to a clean, sound base the lifetime is only about three years.

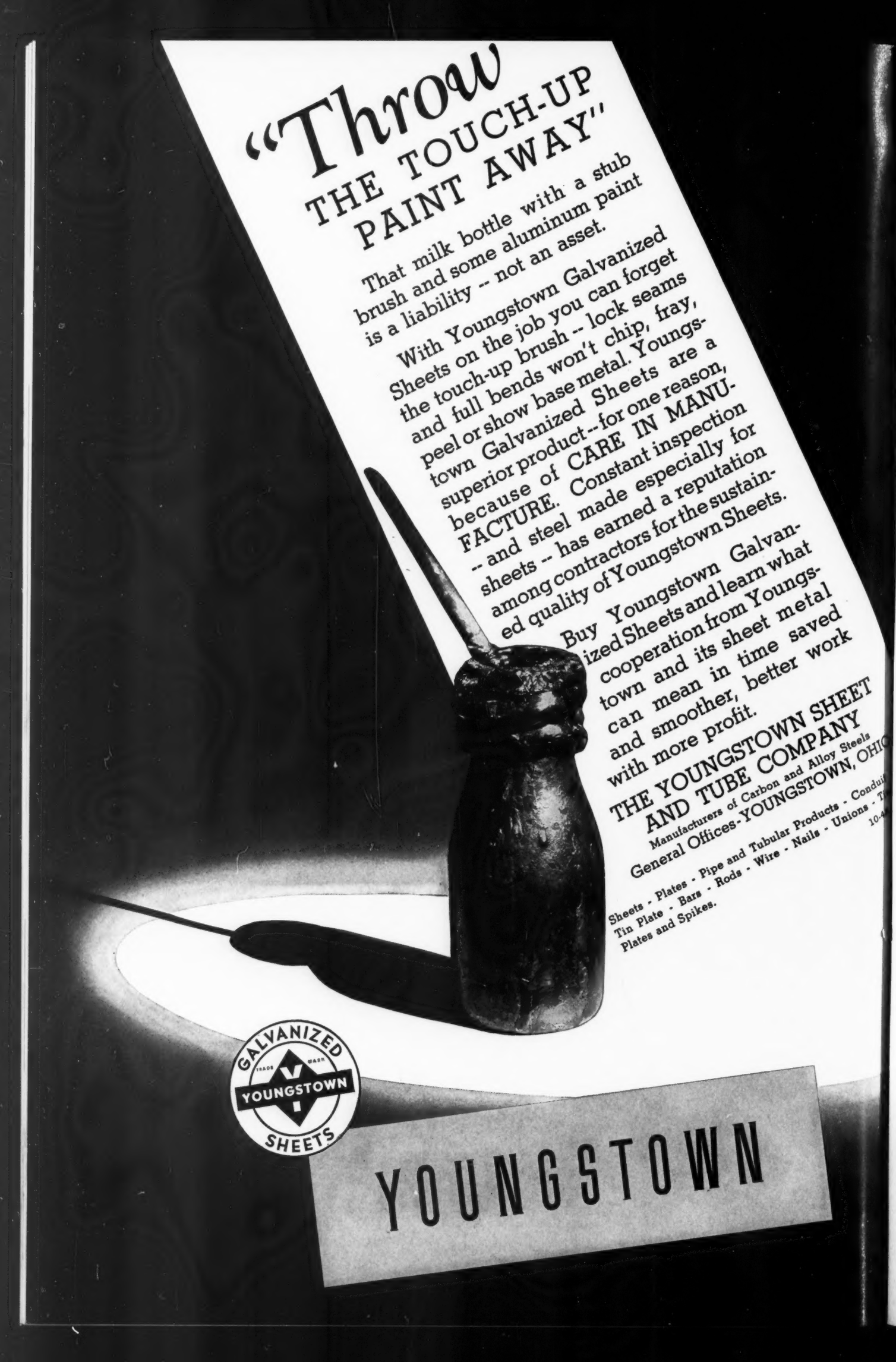
Dipped Metal Pipe

Some work has been done with metal pipe dipped in A. C. E., but the experience is limited and very little known as to the lifetime of this material.

Tile

Vitrefied glazed tile is very satisfactory if it has a bell or slip joint. A butt joint tile should never be used. The joints should be caulked either with lead or an acid resisting cement. This is an ideal material with which to line a chimney, for a new construction, but is difficult to install in an old chimney. A manufacturer of clay products, in Iowa, has made samples of a slip joint tile that is very hard and dense. The cost per lineal foot is about one-fourth that of the metal liners, and if made in an oval it could be lowered into an existing chimney.


Uni-Fin
GRILLES and REGISTERS
BEAUTY and
DURABILITY
BARBER-COLMAN COMPANY • ROCKFORD, ILL.


"Throw
THE TOUCH-UP
PAINT AWAY"
That milk bottle with a stub brush and some aluminum paint is a liability -- not an asset.
With Youngstown Galvanized Sheets on the job you can forget the touch-up brush -- lock seams and full bends won't chip, fray, peel or show base metal. Youngstown Galvanized Sheets are a superior product--for one reason, because of CARE IN MANUFACTURE. Constant inspection -- and steel made especially for sheets -- has earned a reputation among contractors for the sustained quality of Youngstown Sheets.
Buy Youngstown Galvanized Sheets and learn what cooperation from Youngstown and its sheet metal can mean in time saved and smoother, better work with more profit.
THE YOUNGSTOWN SHEET AND TUBE COMPANY
Manufacturers of Carbon and Alloy Steels
General Offices-YOUNGSTOWN, OHIO
Sheets - Plates - Pipe and Tubular Products - Conduit
Tin Plate - Bars - Rods - Wire - Nails - Unions - T
Plates and Spikes.
10-4
GALVANIZED
TRADE MARK
YOUNGSTOWN
SHEETS
YOUNGSTOWN

Editorial Index for 1938

Advertising, Selling, Display

Sculpture in Copper.....Mar. 38, p 43
(Bridgeport Brass Co.'s Texas Ranger)
The Quad Cities Campaign to Prove "Building Costs are NOT too High".....Jun. 38, p 24
Sioux City, Iowa, Master Warm Air Assn. Display for Public Education.....Jun. 38, p 27
Cold Canvassing .....Dec. 38, p 50

Air Conditioning, Agricultural

The Bin Method of Drying Seed Corn (Part II) By A. H. Wright and F. W. Duffee....Feb. 38, p 36
Designing a Seed Corn Drier (Part I) by A. R. Wagstaff .....Sept. 38, p 40
Designing A Seed Corn Drier (Part II) by A. R. Wagstaff .....Oct. 38, p 40
Designing A Seed Corn Drier (Part III) by A. R. Wagstaff .....Nov. 38, p 29
Tobacco Drying Barns and Cabinets.....Dec. 38, p 20

Air Conditioning of Houses

House Heated by Floor Plenums.....Jan. 38, p 113
We Test a "Loop".....Mar. 38, p 65
A Gas Heated, Fan Cooled California Office Building, by W. W. Howe.....May 37, p 62
A System to Provide Year 'Round Comfort (Rooksby residence, Peoria) .....Aug. 38, p 26
Oil-Fired, Two-Speed Blower System....Sep. 38, p 66
(Correction) .....Oct. 38, p 31
A Five-Zone, Gas System with Continuous Fan Operation .....Oct. 38, p 57
Heating Costs for Temperatures Above 70 deg.....
.....Nov. 38, p 31
Designed According to the Minneapolis Code.....
.....Nov. 38, p 49
Comparative Fuel Costs For a Warm Floor Plenum System .....Nov. 38, p 54
Chimney Liners .....Dec. 38, p 44

Air Conditioning—Small Commercial

A Cooling Survey of Lincoln, Nebraska...Aug. 38, p 37

Air Conditioning Theory

Public Ignorance of A. C. (E).....Aug. 38 p 23

Apprenticeship

The Cleveland Plan for Apprenticeship Training by Willett M. Riley.....Jul. 38. p. 28

Association Activities

National Warm Air Heating and Air Conditioning Assn., American Society of Heating and Ventilating Engineers, American Society of Refrigerating Engineers .....Jan. 38, p 65-72
The National Warm Air Convention....Feb. 38, p. 28
Indiana Tries Convention Innovation....Feb. 38, p 34
Illinois Association Resumes Activity....Feb. 38, p 67
Association Activities .....Feb. 38, p. 71
Michigan Censures Use of "Seconds" and Direct Selling of Materials.....Mar. 38, p. 40
Wisconsin Contractors Go to School.....Mar. 38, p 48
Association Activities .....Mar. 38, p 88

Association Activities (Continued)

Association Progress (E).....Apr. 38, p. 27
New York State Assn. Discusses Legislation, Business and Technology.....Apr. 38, p 31
Association Activities .....Apr. 38, p 80
Ohio Convention Dips Into Some of the Costs of Doing Business .....May 38, p 37
Association Activities .....May 38, p 73
27th Annual—National Association of Sheet Metal Distributors .....Jun. 38, p 63
Association ctivities .....Jun. 38, p 64
National Advertising, Association Cooperation, Condensation, Pressure Losses, Stoker Firing, Cooling Controls, Feature NWAH&AC Meet....Jul. 38, p 32
Pennsylvania Contractors Reorganize State Assn.....
.....Jul. 38, p 67
Association Activities .....Jul. 38 p 70
Association Activities .....Aug. 38, p 76
Association Activities .....Sep. 38, p 83
Association Activities .....Oct. 38, p 74
Association Activities .....Nov. 38, p 69
Association Activities .....Dec. 38, p 70

Authors

Baybutt, J. W. .....Nov. 38, p 42; Dec. 38, p 24
Broderick, E. L.....July 38, p 45; Aug. 38, p 56
Buck, Everett S.....Nov. 38, p 54
Davis, A. F.....Jan. 38, p 52; Apr. 38, p 36
Dingle, Jos. G.....Jan. 38, p 58
Duffee, F. W.....Feb. 38, p 36
Eck, M. C. .....Dec. 38, p 44
Fahnestock, M. K.....Jul. 38, p 45; Aug. 38, p 56
Faille, C. H. .....Dec. 38, p 22
Frost, L. H..Mar. 38, p 38;; May 38, p 34; Jun. 38, p 32
Frost, L. H..Mar. 38, p 38; May 38, p 34; Jun. 38, p 32
Fuller, E. F. .....Apr. 38, p 52; Dec. 38, p 55
Hawkins, Frank E.....Oct. 38, p 44
Helmrich, G. B.....Jan. 38, p 132
Hermann, C. C.....Jun. 38, p 38
Howe, W. W. .....May 38, p 62; Dec. 38, p 40
Hyatt, L. F.....May 38, p 46
Jeske, R. F.....
.....Feb. 38, p 26; Mar. 38, p 44; Sep. 38, p 46
John B. F.....Jan. 38, p 54; May 38, p 32
Konzo, S. Jan. 38, p 122; Feb. 38, p 56; Jul. 38, p 45; Aug. 38, p 56; Sep. 38, p 53;; Oct. 38, p 49; Nov. 38, p 45
Kratz, A. P...Jul 38, p 45; Aug. 38, p 56; Sep. 38, p 53;
.....Oct. 38, p 49; Nov. 38, p 45
Kruckman, Arnold .....
Feb. 38, p 32; Mar. 38, p 60; Apr. 38, p 42; May 38,
.....p 42; Jun. 38, p 18; Jul. 38, p 27; Nov. 38, p 39
Kurtz, John W.....
Apr. 38, p 57; Jul. 38, p 62; Sep. 38, p 57; Nov. 38, p 57
Laing, A. B.....Sep. 38, p 34; Oct. 38 p 39
Lankford, C. H.....Jan. 38, p 136;
.....Feb. 38, p 63; Mar. 38, p 74; Apr. 38, p 54
Larsen, E. L...Jul. 38, p 40; Aug. 38, p 29; Sep. 38, p 36
McCawley, James .....Dec. 38, p 26
McDaniel, Ruel .....Sep. 38, p 50
Miller, Prof. Lorin G.....
.....Jan. 38, p 120; Feb. 38, p 53; Mar. 38, p 62
Nason, R. C. May, 38 p 40; Sep. 38, p 39; Nov. 38, p 36
Neubecker, William .....
.....Jan. 38, p 144; Feb. 38, p 60; Mar. 38, p 68
Apr. 38, p 62; May 38, p 60; Aug. 38, p 32; Sep. 38, p 60; Oct. 38, p 54; Nov. 38, p 32; Dec. 38, p 52

Authors (Continued)

Price, L. C.....Sep. 38, p 68; Oct. 38, p 63
Riley, Willett, M.....Jul. 38, p 28
Ritter, Fred U. .....Jan. 38, p 54
Schisler, Edwin C.....Aug. 38, p 55
Schultz, R. H.....Sep. 38, p 64
Schwartz, B. L. .....Feb. 38, p 50; Dec. 38, p 37
Stearns, G. R.....Jan. 38, p 61
Teesdale, L. V.....Jan. 38, p 117
Tharp, Chas. E.....Jan. 38, p 149
Voorhees, G. A.....Jan. 38, p 109; Feb. 38, p 45; Mar. 38, p 57; Apr. 38, p 48; May 38, p 54; Jun. 38, p 53; Jul. 38, p 57; Sep. 38, p 62; Oct. 38, p 66
Wagstaff, Alfred R.....
.....Sep. 38, p 40; Oct. 38, p 40; Nov. 38, p 29
Watson, George H. .....Mar. 38, p 46; Dec. 38, p 50
Weitkam, W. J.....Jan. 38, p 44
White, W. H. .....Dec. 38, p 32
Wright, A. H..... .....Feb. 38, p 36
Ziliotto, G. C.....Nov. 38, p 52

Codes and Ordinances, Licensing

Cities Having Heating Ordinances (Jan. 1, '38).....
..... Jan. 38, p 47
1938 Heating Ordinances.....Jan. 38, p 48
Fort Wayne's Experience with Licensing and Heating Code, by Chas. E. Tharp.....Jan. 38, p 149
Fort Wayne Licensing Ordinance.....Feb. 38, p 40
Building Codes (E).....Mar. 38, p 33
The Fort Wayne Licensing Ordinance..Mar. 38, p 52
The Licensing and Permit Code of Toledo, O.....
.....Apr. 38, p 67
The Licensing and Permit Code of Toledo, O.....
.....May 38, p 67
Sioux City, Iowa Furnace Ordinance....Jun. 28, p 28
Sioux City, Iowa, Furnace Ordinance (Part 2).....
.....Jul. 38, p 69
Sioux City, Iowa, Furnace Ordinance (Part 3).....
.....Aug. 38, p 67
Code of Minimum Requirements (E)....Aug. 38, p 23
Professor J. D. Hoffman (obituary).....Sep. 38, p 33
Some Code Problems (E).....Oct. 38, p 31
The Warm Air Heating Ordinance of Salem, Ore.....
.....Nov. 38, p 67
The Warm Air Heating Ordinance of Salem, Oreg...
.....Dec. 38, p 63

Cooling

Cooling Power of Furnace and Attic Ventilating Fans by G. B. Helmrich.....Jan. 38, p 132
An Inventory of Attic Ventilation in Southwest Cities —Dallas, Texas .....Apr. 38, p 45
A Combination Night Air Cooling—Warm Air Heating System .....May 38, p 49
An Inventory of Attic Ventilation in Southwestern Cities—San Antonio .....May 38, p 58
A Gas Heated, Fan Cooled California Office Building, by W. W. Howe.....May 38, p 62
An Inventory of Attic Ventilation in Southwest Cities—New Orleans .....Jun. 38, p 58
Study of Summer Cooling in the Research Residence Using a Small Capacity Mechanical Condensing Unit, by Kratz, Konzo, Fahnestock & Broderic.....
.....Jul. 38, p 45
Attic Fan Installation Practices.....Jul. 38, p 54
A Cooling Survey of Lincoln, Nebraska.Aug. 38, p 37
Study of Summer Cooling in the Research Residence Using a Small Capacity Mechanical Condensing Unit, by Kratz, Konzo, Fahnestock & Broderick.....
.....Aug. 38, p 56
Attic Fan Installation Practices.....Aug. 38, p 61

Duct Construction

200,000 Pounds of Ducts.....Mar. 38, p 34
Installing Duct Systems 60 Miles from Home.....
.....Apr. 38, p 59
Materials for Ducts Subject to Corrosion, by C. C. Hermann .....Jun. 38, p 38

Dust Collecting

Lint Collector for a Mattress Factory. by J. W. Baybutt .....Nov. 38, p 42

Engineering Design Data

Precalculated Engineering, by G. A. Voorhees.....
.....Jan. 38, p 109
A House Heated by Floor Plenums.....Jan. 38, p 113
Precalculated Engineering, by G. A. Voorhees.....
.....Feb. 38, p 45
So You Think Second Floor Returns Are Not Needed? by B. L. Schwartz.....Feb. 38, p 50
Precalculated Engineering, by G. A. Voorhees.....
.....Mar. 38, p 57
We Test a "Loop".....Mar. 38, p 65
Basement Recreation Rooms (Part 2)....Mar. 38, p 71
Precalculated Engineering, by G. A. Voorhees.....
.....Apr. 38, p 48
Installing and Adjusting Oil-Fired Heating Equipment, by E. F. Fuller.....Apr. 38, p 52
Basement Recreation Rooms (Part 3)...May 38, p 52
Precalculated Engineering, by G. A. Voorhees.....
.....May 38, p 54
Blow Down Furnace in the Attic.....Jun. 38, p 41
Cost Analysis of a Basementless System..Jun. 38, p 42
Round Pipe Attic Supply with Concrete Trench Return .....Jun. 38, p 44
Drop Ceiling System.....Jun. 38, p 45
Two-Story, Basementless, Modern House.Jun. 38, p 46
Low Cost House Displayed within a Department Store (Cleveland) .....Jun, 38, p 47
A Typical Detroit Basementless Installation.....
.....Jun. 38, p 48
Sidewall and Ceiling Supplies Through Joist Spaces..
.....Jun. 38, p 50
First Low Cost House in Mississippi.....Jun. 38, p 51
Gravity System for a Low Cost House..Jun. 38, p 52
Precalculated Engineering, by G. A. Voorhees.....
.....Jun. 38, p 53
Precalculated Engineering, by (Heat Loss from Infiltration), by G. A. Voorhees.....Jul. 38, p 57
Air for Oil Burner Combustion, by E. C. Schisler....
.....Aug. 38, p 55
Some Causes of Floor-Ceiling Temperature Variation, A. P. Kratz and S. Konzo.....Sep, 38, p 53
Precalculated Engineering, G. A. Voorhees.....
.....Sep. 38, p 62
Chart for Correcting Pipe Size for Equivalent Length, R. H. Schultz.....Sep. 38, p 64
Precalculated Engineering, by G. A. Voorhees.....
.....Oct. 38, p 66
Research Residence Suggestions for Reducing Floor-Ceiling Temperature Differences, by A. P. Kratz and S. Konzo.....Nov. 38, p 45
Infiltration Loss—Its Effect on Furnace-Blower Capacity, by C. G. Ziliotto.....Nov. 38, p 52
Comparative Fuel Costs for a Warm Floor Plenum System, by Everett S. Buck.....Nov. 38, p 54
Temperature Drop in Ducts.....Dec. 38, p 37
Fan-Furnace Heating in California.....Dec. 38, p 40
Chimney Liners .....Dec. 38, p 44

Filters

Characteristics of Air Borne Particles, by John W. Kurtz .....Apr. 38, p 57
Characteristic of Air Borne Particles, Part 2, by John W. Kurtz .....Jul. 38, p62

Filters (Continued)

Characteristics of Air Borne Particles, Part 3, by John W. Kurtz .....Sep. 38, p 57
Characteristics of Air Borne Particles, Part 4, by John W. Kurtz .....Nov. 38, p 57

Flashing

$500 Worth of Flashing Could Have Saved $25,000 .....Apr. 38, p 40
Water Penetration Prevention (Milwaukee plant)..... .....Sep. 38, p 44
Gutters, Leaders and Drainage.....Dec. 38, p 26

Forced Air Heating Facts From the Research Residence

Friction Pressure Loss Through Duct Fittings, by S. Konzo .....Jan. 38, p 132
How to Measure Air Volumes, by S. Konzo..... .....Feb. 38, p 56
Pressure Losses in Air Ducts Due to Changes in Cross Section .....Aug. 38, p 28
Some Causes of Floor-Ceiling Temperature Variation, A. P. Kratz and S. Konzo.....Sep. 38, p 53
Intermittent vs. Two-Speed Blower Operation in Research Residence—A. P. Kratz and S. Konzo.... .....Oct. 38, p 49
Research Residence Suggestions for Reducing Floor-Ceiling Temperature Differences by A. P. Kratz and S. Konzo .....Nov. 38, p 45

Fume Removal

Fume Exhaust and Recovery For a Solvent Tank.... .....Dec. 38, p 24

General Business

1937—What Was the Record (E).....Jan. 38, p 41
Profit and Loss Records of Philadelphia Shops, by Fred U. Ritter and B. J. John.....Jan. 38, p 54
The Books of Bookkeeping, by Jos. G. Dingle..... .....Jan. 38, p 58
A Nation Comes of Age (E).....Feb. 38, p 23
Arnold Kruckman's Washington Letter...Feb. 38, p 32
Home Building (E).....Mar. 38, p 33
Michigan Censures Use of "Seconds" and Direct Selling of Materials.....Mar. 38, p 40
Arnold Kruckman's Washington Letter...Mar. 38, p 60
Association Progress (E).....Apr. 38, p 27
"I Agree to Heat" (E).....Apr. 38, p 27
Republic's New Continuous Strip Mill....Apr. 38, p 34
Arnold Kruckman's Washington Letter...Apr. 38, p 42
The Small Shop Can Operate at Lower Cost (E).... .....May 38, p 29
Overhead Expense Items from Philadelphia Records, by B. F. John.....May 38, p 32
Arnold Kruckman's Washington Letter...May 38, p 42
FHA—Products or Services Eligible for Loans..... .....Jun. 38, p 17
Title 1—Modernization (and New Construction Under $2,500) by Arnold Kruckman.....Jun. 38, p 18
Title 2—New Construction (up to $6,000 Total Cost.. .....Jun. 38, p 20
The Routine of an FHA Loan.....Jun. 38, p 22
Sales Mean Jobs (E).....Jul. 38, p 23
Arnold Kruckman's Washington Letter—Low-Cost Housing .....Jul. 38, p 27
The Cleveland Plan for Apprenticeship Training..... .....Jul. 38, p 28
Public Ignorance of A. C. (E).....Aug. 38, p 23
Code of Minimum Requirements (E).....Aug. 38, p 23
The Butchers (E).....Sep. 38, p 33
Inland's New Continuous Strip Mill.....Sep. 38, p 48
Ready for Winter (E).....Oct. 38, p 31
A Survey of Time Payment Plans.....Oct. 38, p 35
Merrily We Roll Along (E).....Nov. 38, p 25
Arnold Kruckman's Washington Letter—The Wage-Hours Law .....Nov. 38, p 39
Installment Credit Problems.....Dec. 38, p 32

Heating, Ventilating and Air Conditioning for Large Buildings

A Combination System (School, Merrill, Wis)..... .....Jan. 38, p 129
200,000 pounds of Ducts.....Mar. 38, p 34
Fan-Furnace Heating in California.....Dec. 38, p 40

Humidification

Condensation of Moisture in Walls and Attics, by L. V. Teesdale.....Jan. 38, p 116
What is This Thing Called Humidity? By Lorin G. Miller .....Jan. 38, p 120
Why Humidify? By Lorin G. Miller.....Feb. 38, p 53
Where Does All That Water Go? By L. G. Miller.. .....Mar. 38, p 62

Insulation

New Applications of Light Weight Sheet Copper.... .....Jul. 38, p 24
Window Conditioning .....Oct. 38, p 60
Heat Conservation in Gas Heated Buildings..... .....Nov. 38, p 62
Heat Conservation in Gas Heated Buildings..... .....Dec. 38, p 46

Metal Fabrication

Hermann and Grace Co. 1886-1938.....Apr. 38, p 28
Shop Fabricated Pop Corn Machine.....Jul. 38, p 31
Swanda Has Served Oklahoma City since Oklahoma was a Territory.....Aug. 38 p 24
A Bright Metal Kitchen, A. B. Laing....Sep. 38, p 34
Light Weight Truck Bodies, R. C. Nason.Sep. 38, p 39
Silver Soldering Copper Plate Vessels....Nov. 38, p 40
Covers for Printing Press Ink Rolls....Dec. 38, p 22

Motors

Small Motors for Residential Air Conditioning, by C. H. Lankford.....Jan. 38, p 136
Small Motors for Residential Air Conditioning, by C. H. Lankford .....Feb. 38, p 63
Small Motors for Residential Air Conditioning, by C. H. Lankford.....Mar. 38, p 74
Small Motors for Residential Air Conditioning, by C. H. Lankford.....Apr. 38, p 54

Oil Burning

Installing and Adjusting Oil-fired Heating Equipment .....Apr. 38, p 52
Air For Oil Burner Combustion.....Aug. 38, p 55
Oil Fired, Two-Speed Blower System....Sep. 38, p 66
A. S. T. M. Revised Fuel Oil Specifications..... .....Nov. 38, p 53
Designed According to the Minneapolis Code..... .....Nov. 38, p 49
Routine for Checking Oil Burner Jobs...Dec. 38, p 55

Patterns, Air Conditioning Fittings

Pattern Development for Air Conditioning Fittings, by Wm. Neubecker
Short-Cut Transition Offset .....Jan. 38, p 144
Compound Offset Elbow, Curved Corners.Feb. 38, p 60
Reverse Center, Reverse Offset Elbows..Mar. 38, p 68
45 Deg. Transition, with Off-Center Round Opening.. .....Apr. 38, p 62
Reverse Center Stack Elbow with Curved Heel..... .....May 38, p 60
Reversed Right and Left Offset Elbow....Sep. 38, p 60
Compound, Double-Curved, Twisted, Offset Elbow.... .....Oct. 38, p 54
Transition Rectangular to Round.....Dec. 38, p 52

Patterns, Architectural

Pattern for a Twelve-Pointed Star, L. F. Hyatt.....May 38, p 46
Half Round Circular Gutter, Wm. Neubecker.....Aug. 38, p 32
Short Cut Pattern for a Shanty Top or Roof Jack, by Wm. Neubecker .....Nov. 38, p 32

Problems

Twin Cased Furnaces .....Feb. 38, p 39
Air Space Under Insulation.....Feb. 38, p 39
November Dirt Problem.....Mar. 38, p 51
Register Location .....Mar. 38, p 51
Soldering Stainless Steel.....Apr. 38, p 39
Basement Recreation Rooms.....Apr. 38, p 39
Fireplace dirt .....Apr. 38, p 39
Complaints on insufficient heat.....Apr. 38, p 39
Basement Condensation .....Jun. 38, p 60
Attic Temperature Table.....Jun. 38, p 60
Stack Sizes for High Registers.....Jun. 38, p 60
Protecting Woodwork .....Jul. 38, p 38
"Best" Set of Books.....Jul. 38, p 38
Chimney Insulation .....Jul. 38, p 38

July Chimney Problem (N. E. Stilphen)..Aug. 38, p 34
November Dirty Furnace Problem (Grandstaff).....Aug. 38, p 34
Crackage vs. Air Change (Williams).....Aug. 38, p 34
Insulation for Large Compressor.....Sep. 38, p 75
Poor Chimney Draft.....Sep. 38, p 75
Attic Insulation .....Sep. 38, p 76
Fireplace as a Ventilator.....Sep. 38, p 76
Galvanized Over Old Roof.....Oct. 38, p 43
Radiator Hoist .....Nov. 38, p 34
Cooling Converter Room.....Nov. 38, p 34
Air Velocity Through Casing.....Nov. 38, p 34
Precalculated Engineering .....Nov. 38, p 35
Flux for Stainless Steel.....Nov. 38, p 35
Condensation Ruins Woodwork.....Dec. 38, p 29
Covering A Tin Roof .....Dec. 38, p 29
Value of Some Outside Air .....Dec. 38, p 29

Roofing

1937's Largest Copper Roof.....Jan. 38, p 44
Roofing by Remote Control, by Geo. J. Watson.....Mar. 38, p 46
Monel Drainage System on a Residence..May 38, p 40
Light Weight Copper Roofs.....Oct. 38, p 32
Gutters, Leaders and Drainage.....Dec. 38, p 26

Schools

Michigan State College Forced Warm Air Short Course .....Mar. 38, p 73
Moore School of Technology.....Sep. 38, p 85

Sheet Metal Work, Architectural

1937's Largest Copper Roof, by W. J. Weitkam.....Jan. 38, p 44
Lead-Coated Copper Enrichment (Varsity Theatre)...Feb. 38, p 24
$500 Worth of Flashing Could Have Saved $25,000 (Main Township School).....Apr. 38, p 40
Porcelain Enamel Sheet Exterior.....Apr. 38, p 58

Sheet Metal Work, Architectural (Continued)

Monel Drainage System on a Residence, R. C. Nason..May 38, p 40
Chrominum Nickel Stainless Steel for Drainage Systems .....Jun. 38, p 30
The Newark, N. J. Station.....Jun. 38, p 34
New Applications of Light Weight Sheet Copper.....Jul. 38, p 24
A Low-Cost, All-Steel House (Blaw-Knox) .....Jul. 38, p 36
Sidewalk Mosaics by a Sheet Metal Contractor.....Oct. 38, p 44
Powdered Milk Silo with Metal-Lined Floor and Walls .....Nov. 38, p 26
Porcelain Enamel Steel, by R. C. Nason..Nov. 38, p 36
Spandrel Ornamentation .....Dec. 38, p 18
Gutters, Leaders and Drainage.....Dec. 38, p 26
Steel House Goes to Sea .....Dec. 38, p 30

Specialty Manufacturing

Hermann and Grace Co., 1886-1938.....Apr. 38, p 28
Alamo of San Antonio.....May 38, p 30
Orchard Heaters .....May 38, p 44
Swanda Has Served Oklahoma City Since Oklahoma was a Territory .....Aug. 38, p 24
Small Town Shop Finds Profits in Small Specialty Items, Ruel McDaniel .....ep. 38, p 50
Mary Carlisle, Tinsmith (Figurines) A. B. Laing.....Oct. 38, p 39
Radiator Valve Covers.....Dec. 38, p 28

Stokers

Stoker Performance in Residence Heating, by L. C. Price .....Sep. 38, p 68
Stoker Performance in Residence Heating, Part II—by L. C. Price, Uni. of Ark.....Oct. 38, p 63

Ventilation

Composing Room Ventilating System, by G. R. Stearns .....Jan. 38, p 61
Ventilating "Dark Rooms," by R. F. Jeske.Feb. 38, p 26
Ventilating a First Floor Tavern, by R. F. Jeske, Milwaukee .....Mar. 38, p 44
Ventilating a Residence Kitchen, R. F. Jeske.....Sep. 38, p 46
Fire Hazards in Ventilating Systems.....Sep. 38, p 47

Welding Practice

Arc Welding, by A. F. Davis.....Jan. 38, p 52
Resistance Welding (Part 4) L. H. Frost.Mar. 38, p 38
How to Tell a Good Weld, by A. F. Davis.....Apr. 38, p 36
Resistance Welding (Part 5) L. H. Frost.May 38, p 34
Resistance Welding (Part 6) L. H. Frost..Jun. 38, p 32
Technique for Resistance Welding Ferrous and Non-Ferrous Sheet Metals, E. I. Larsen.....Jul. 38, p 40
Technique for Resistance Welding in Ferrous and Non-Ferrous Sheet Metals, E. I. Larsen....Aug. 38, p 29
Technique for Resistance Welding Ferrous and Non-Ferrous Sheet Metals, E. I. Larsen....Sep. 38, p 36
Steel House Goes to Sea.....Dec. 38, p 30
Welding Tantalum Sheets .....Dec. 38, p 31

The Warm Air Heating Ordinance of Salem, Oregon [Part 2]

Since January, 1936, we have published sections of the heating ordinance, of some city, in practically every issue. During this time the codes of Minneapolis; Ft. Wayne, Indiana; Toledo, Ohio; Sioux City Iowa, have been published in full. This ordinance of Salem, Oregon, has been in effect since 1935 and, while not as detailed as some others, is a satisfactory code. This Part 2 covers air volumes, velocities throughout the system, furnace construction.

ARTICLE IV

This article pertains only to mechanical warm air heating systems.

Section 1. The heat loss from each room shall be determined as follows:

Divide the square feet of exposed glass by 12; divide the square feet of net exposed wall surface, ceiling, or floor by the factor applicable according to Table A of Article III; divide the volume in cubic feet by 1000; add together the results obtained and multiply by 1000. The result is the structed of welded or riveted material not lighter than No.

Section 2. The required furnace capacity shall be determined from either of the following formulas:

$$L = \frac{H_t}{160}$$

$H_t = H_t \times 1.9$, in which

L = capacity rating of the furnace in square inches of basement pipe area as determined according to Article III,

H_t = sum of heat loss from the building obtained by adding the heat loss from each room as calculated in section 1, and

H_t = heat input rating of gas in Btu per hour.

Section 3. The volume of air required and to be supplied to each room shall be determined from the following formula:

$$Q = \frac{H}{1.1\,(t_r - t_i)}, \text{ in which}$$

Q = volume of air in cubic feet per minute,

H = heat loss from the room in Btu per hour,

t_r = temperature of the air at the register in degrees Fahrenheit, and

t_i = temperature of the air at the fan inlet in degrees Fahrenheit.

Section 4. (a) Where registers or grills are placed less than six feet above the floor, the net free area shall be such that the calculated velocity through the free areas is not more than 300 feet per minute.

(b). Where a register is placed in a wall more than six feet above the floor, the net free area of the register shall be such that the calculated velocity through the free area does not exceed 600 feet per minute.

(c). The area of each warm air or return pipe, stack, connection, or fitting shall be such that the calculated velocity through its free area does not exceed 800 feet per minute.

(d). The velocity through each pipe, register, connection, and fitting shall be determined from the formula

$$V = \frac{Q \times 144}{A}, \text{ in which}$$

A = net free area in square inches, and

V = velocity of the air in feet per minute.

Section 5. A well-fitted and securely attached inner casing conforming to the shape of the furnace body, but leaving a free air space such that the calculated velocity through this space is not less than 300 feet per minute shall be used.

Section 6. (a). The blower capacity in cubic feet per minute shall be equal to the total volume of air required as obtained by totalling the volume for each room according to section 3.

(b). The static pressure due to piping systems to be used in selecting the blower shall be not less than given below.

⅛-inch equivalent water column for volumes up to 1500 cfm.

$\frac{3}{16}$-inch equivalent water column for volumes between 1500 and 2000 cfm.

¼-inch equivalent water column for volumes between 2000 and 3000 cfm.

$\frac{5}{16}$-inch equivalent water column for volumes between 3000 and 4000 cfm.

⅜-inch equivalent water column for volumes between 4000 and 5000 cfm.

If washers or filters are used, additional resistance must be calculated as required for these units.

(c). An adjustable thermostatically-automatic furnace switch shall be installed in the bonnet of the furnace to start and stop the blower.

(d). Each warm air duct or pipe leading to a register box and each cold air duct shall have a damper with a substantial locking device.

ARTICLE V

Section 1. (a). Steel warm air furnaces shall be constructed of welded or riveted material not lighter than No. 8 U. S. standard gage in the combustion chamber and not less than No. 14 U. S. standard gage in the radiator, and the combustion chamber and radiator shall be constructed air tight. The feed chute, if of steel, shall be constructed of material not lighter than No. 10 U. S. standard gage. The fire box shall have a cast iron or fire brick lining extending not less than four inches above the bottom of the feed door and in no case less than 12 inches above the grate. Horizontal steel warm air furnaces, except gas furnaces, shall have linings on the bottom of the fire box extending in height to a distance equal to one-third of the height of the combustion chamber.

(b). The fire pots of cast iron warm air furnaces shall be not less than one-half inch in thickness. The thickness of the fire pot is to be measured at the thinnest part of the main body. Any steel used in cast iron furnaces shall comply with the requirements for steel furnaces.

(c). All collars or connections between the combustion chamber and the radiator shall be cast iron or of steel not lighter than No. 8 U. S. standard gage.

(d). The combustion chamber shall be defined as the inside surface of that chamber immediately over the fuel bed. The radiator shall be defined as any portion of the surface outside of the combustion chamber which carries products of combustion to the smoke pipe.

ARTICLE VI

Section 1. The location of the furnace in a gravity warm air heating system shall equalize the length of warm air pipes as far as possible, yet give necessary preference to pipes supplying rooms having unusual requirements.

Section 2. (a). A furnace foundation of brick, cement,

or other like foundation shall extend at least 15 inches to the rear and sides of the furnace casing and at least 35 inches in front of furnace casing. Foundations shall be level.

(b). Where it is necessary to place a furnace on a combustible floor, not less than four inches of hollow tile shall be used, having joists matched in such a way that air passages will be free from side to side, so that at no time will the removal of ashes or the handling of fuel close up these openings. Such foundation shall be constructed upon and covered with continuous sheet metal plates of not less than No. 24 U. S. standard gage metal, having all joints substantially riveted or double seamed and the bottom sheet shall have the edges turned up at least one inch. This floor covering shall extend under the whole of the fire box and ash pit of the furnace and outwardly not less than 12 inches on all sides and rear of the casing or base ring and 36 inches in front.

Section 3. (a). The base ring of any portable warm air furnace shall be cemented to the foundation and cement flushed in around the back of the base ring, making an airtight joint. The furnace parts shall be assembled plumb and level and in a workman-like manner.

(b). All sections and joints shall be properly fitted. Joints requiring cement shall be well fitted and all bolts shall be drawn up tightly.

Section 4. (a). Warm air furnaces shall be enclosed in metal casings or walls of brick, tile, or concrete.

(b). Sheet metal casings including casing tops or bonnets shall be made of galvanized sheets not lighter than 28 gage when less than 50 inches in diameter and not less than 26 gage when 50 inches or more in diameter. They shall fit the casings and casing rings closely, so as to be dust tight, and shall be securely fastened to the front. The casing shall be lined from the upper casing ring down to a line on a level with the grate. A dustproof access opening into the casing shall be provided. No gravity warm air furnace shall be installed having a free area less than 10 per cent greater than the combined calculated leader pipe area. "Free area" shall be construed to mean the net unobstructed area between the heating surfaces and the casing.

(c). When side collars are used, the casing top or bonnet must be of sufficient height so that the largest warm air pipe can be taken from the side without ovalling. In no case shall a distance less than eight inches be maintained between the top of any furnace and the bonnet.

(d). No furnace casing or top coming nearer than six inches of ceiling of joists shall be allowed in any case. All metal casing tops shall be insulated with an air space or covered with magnesia, asbestos boiler covering, or sand.

(e). Openings for side casing collars shall be cut into the casing top or bonnet so that the tops of all openings are on a level. Casing collars shall be fitted into place with a proper flange or bead on the outside and drawn up on the inside, making a dust tight joint, or dove-tailed in and the joint positively sealed against entrance of dust. All collars shall be of the same size as the warm air pipes to which they are to be connected.

(f). Brick, cement, or hollow tile casings shall be constructed as follows: Walls shall be not less than eight inches in thickness and shall be constructed air tight. The least inside dimension of rectangular casings shall be the same as that of the portable casing of a corresponding size of furnace. Walls shall be carried to the same height as the portable walls, allowing not less than eight inches between the top of the furnace and the bottom of the top cover. After placing the collars for the warm air pipes, the masonry shall be continued two inches above the top of the collars, angles, or tee irons shall be laid across the furnace top, spaced eight inches, covered with sheet metal not less than 26 gage and the sheet metal covered with masonry or sand and the side walls run four inches above the roof of the furnace. A galvanized iron casing bonnet may be used on a brick-set casing. Provision shall be made in the walls for a manhole to give ingress to the heater.

Section 5. (a). All warm air pipes shall be made of bright tin no lighter than IC or of galvanized iron. Side seams of round pipes shall be locked seams. All joints of round pipes shall be either double seamed or lapped not less than one and one-fourth inch. Such joints shall be match-beaded, or beaded and soldered, or riveted. Each pipe and fitting shall be properly secured to ceiling or joist. No solder or riveted joint shall be required where round pipe slips over the casing collar or enters boot or box. Any round pipe fifteen inches or greater in diameter shall not be made of material lighter than IX tin or No. 26 gage galvanized iron.

Rectangular ducts or pipes shall be of weights and shall have locked seams, slip-locked seams, standing seams, or be reinforced by angle irons, as shown in Table B.

TABLE B

Gage	Width of Duct in inches	Standing Seam in inches	Reinforced Seam in inches
26	up to 20	...	.....
24	21 to 30	1	.....
22	31 to 48	1	.....
22	49 to 60	1½	⅛ by 1⅜
20	61 to 90	1½	⅛ by 1⅜

(b). All basement warm air pipes of gravity warm air systems shall have an upward pitch not less than one inch per running foot.

(c). No vertical warm air stack or pipe shall be placed in a wood partition or wood enclosure unless it be at least two feet and six inches distant in a horizontal direction from the connection of the pipe to the collar on the furnace, and the distance of a warm air stack from the collar by which it is connected to the furnace shall be not less than four feet, measured along the connecting pipe.

(d). Each basement warm air pipe of a gravity warm air heating system shall be provided with a damper supported on both sides not more than two feet from the furnace casing.

(e). Where a warm air pipe passes through a masonry wall, a metal thimble shall be provided, having a diameter at least one inch greater than the pipe and the pipe shall be supported in such a manner that the air space is uniform on all sides.

(f). Where a warm air pipe passes through or into an unheated space separated from the furnace room, it shall be insulated with not less than three layers of air cell asbestos paper or the equivalent.

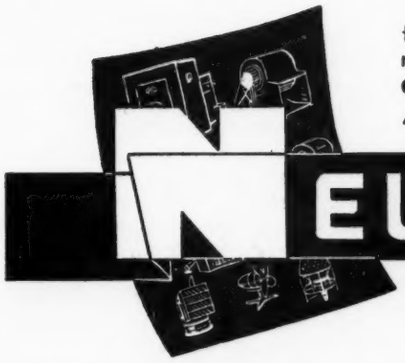
Section 6. (a). All warm air, single walls stacks or wall pipes, heads, boots, ells, tees, angles, and other connections shall be made of tin or galvanized iron and shall be covered with not less than one thickness of 12-pound per 100 square feet asbestos paper. All such stacks shall be braced in a proper manner so as not to obstruct the flow of air but to retain the full capacity throughout. All joints shall be locked and held in place by means of lugs or straps. No joint either horizontal or vertical, shall depend wholly upon solder to make it tight.

(b). All stacks and fittings shall be secured firmly in place. No lugs or straps shall be formed by cutting holes in outer walls of stacks or fittings. No wall pipes or fittings shall be used which depend for strength on soldered joints. The various members shall be so made that all joints are locked or soldered and the several members shall be attached to each other so that they are for the purpose intended air tight.

(c). Where stacks, heads, boots, or other fittings go through the first floor, all openings around such heads, boots, stacks, or fittings, shall be filled with asbestos cement or other incombustible insulating material to make the opening gas and dust tight. In no case shall any metal surface of stacks, heads, boots, or other fittings conveying heated air come in contact with any wood girder, joist, or floorings of the first floor.

(d). No stacks shall be taken off a basement pipe of a gravity warm air heating system leading to a first floor room and no stack shall be taken off the top of a register box.

[To be continued.]



For your convenience a number has been assigned each item. Check the items in which you are interested on the coupon on page 92 and mail to us. Complete information will be forwarded.

● Indicates product not listed in 1938 Directory.

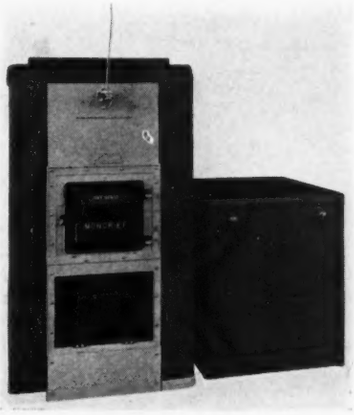
△ Indicates product and manufacturer not listed in 1938 Directory.

NEW PRODUCTS

331—Stoker-Fired Moncrief

The Henry Furnace & Foundry Co., 3471 E. 49th St., Cleveland, announces a new Moncrief Stoker-Fired Winter Air Conditioner.

Tunnels are cut through the casing and ashpit on either side so that the stoker can be inserted in the front or on either side. The drum and radiator are of heavy-gauge open hearth steel electrically welded and gas tight. Clean-out doors are so situated that fly ash can be removed from every



part of the heating unit. In the front is a receptacle in which clinkers can be placed until cool so gases will escape up the flue, and when cooled the entire pan may be removed.

There are two smoke outlets, direct and indirect, with direct outlet coming automatically into action when the fire door is opened which prevents smoke escaping while the fire is being cleaned.

The finish of the cabinet is modern and attractive. This unit is available in a variety of sizes.

◆

332—B-3 Shear

The Beverly Shear Co., 3009 West 110th Place, Chicago, announces the "B-3" Beverly throatless shear—a heavy duty bench type, weighing 55 lbs., height less handle 15 inches, handle 30 inches, width 9 inches, depth 14 inches.

The shear has hand geared rack and pinion power. The maximum shearing capacity is $\frac{3}{16}$ mild U. S. steel, or $\frac{1}{8}$ or 10 gauge alloy.

333—Horn Punch

The W. A. Whitney Mfg. Co., 636 Race Street, Rockford, Illinois, has recently built a special No. 93 Horn Punch, made to punch holes in spinnings 12 in. in diameter, 12 in. high. The holes in the side are made by using a horizontal horn inserted in the square hole in the back of the frame and the holes in the top are made with a vertical horn, which is hinged at the bottom and controlled by a foot pedal.

The parts are interchangeable with the regular bench punches.

◆

334—Carbon Dioxide Indicators

Julien P. Friez & Sons, Division of Bendix Aviation Corporation, 4 N. Central Ave., Baltimore, Maryland, announces a new carbon dioxide in-

dicator containing unique features not found in other apparatus of this general type and of particular interest to those engaged in the design, installation, and servicing of heating equipment—coal, oil, or gas.

This instrument is of a new transparent composition which is strong and durable and absolutely unaffected by the caustic solutions used.

An exclusive Friez feature on these new carbon dioxide indicators is the highly polished, chromium-plated, graduated adjustable scale, making possible accurate readings because errors of parallax are thereby eliminated. Readings are obtained by lining up the meniscus of the vertical mercury column with the graduations on the adjustable scale and the reflection of the meniscus in that polished scale.

Other distinct advantages of this instrument include its very compact size and light weight and ability to make several hundred readings with a single charge of caustic solution.

◆

335—Spot Welder

Thomson-Gibb Electric Welding Co., Lynn, Mass., is offering the Thomson Model B spot welder, a popular priced, practical spot welder said

to handle the medium duty range of work in sheet metal and general welding shops.

Both pressure and current are applied by the foot treadle which actuates the upper welding arm through a pressure spring and back bar. A switch mounted on the back bar controls the welding current.

Specification leaflet is available.

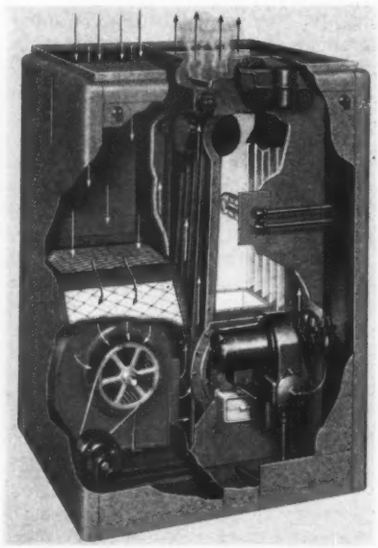
New Products . . . . . .

For your convenience in obtaining information regarding these items, use the coupon on page 92.

● 336—Oil Heat A. C. Unit

The Rudy Furnace Company, Dowagiac, Mich., announces production of a new oil-fired air conditioning unit as an addition to its line.

"Designed for the small home, the new No. 80 Oil furnace has a Btu capacity up to 85,000 per hour," said T. W. Torr, Rudy's chief engineer. "With the coming of the building boom predicted for 1939, it is imperative that our dealers have a self contained unit to offer the small home builder who has become an important factor in heating sales."



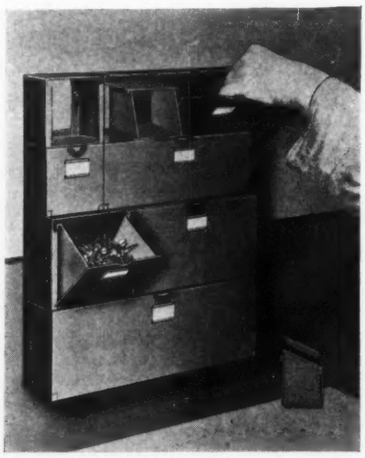
The unit is made of cast iron with a baked green satin-krack enameled steel cabinet. Three air filters, an automatic humidifier and controls are standard equipment with a pressure type oil burner optional.

◆

▲ 337—Add-A-Bin

Noggle Products Co., Ann Arbor, Michigan, is introducing Add-A-Bin—a neat, compact, efficient and low-cost means for keeping track of screws, bolts, nuts, washers, contact points, fuses and the innumerable small parts required in the production, installation and servicing of air conditioning equipment.

This is a system of unit bins sold separately and assembled by the user to fit his individual needs. The bin housing may be screwed to a wall or to a panel which may be fashioned into a portable kit. A bin may be opened for removal of a single item and it is so delicately balanced that the weight of its contents, no matter how light, causes it to close automatically when the mechanic's hand is removed. If, when open, the bin is lifted slightly, it will lock open. Or it may be lifted higher, pulled out and down and remains open horizontally for cleaning. Or it may be removed entirely from the housing.



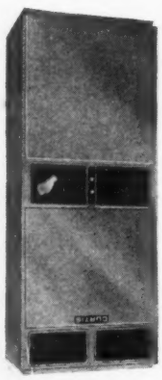
Some mechanics mount Add-A-Bin assemblies on either side of a vertical board, provide it with a wood base and a handle and they have a parts kit.

Add-A-Bin units are made in two series, which may be assembled as shown or in any other desired combination or shape.

◆

338—Curtis Cooler

The Curtis Refrigerating Machine Company, Kienlen Avenue, St. Louis, announces the Curtis store and office cooler. This is a complete packaged



air conditioning unit, factory designed, engineered and built to meet the requirements of all types of business. Available in both 3 and 5-ton capacities, the Curtis store and office cooler offers the advantage of being semi-portable, in that only water and electrical connections are necessary for installation. The cabinet is constructed of heavy gauge automobile steel, with an attractive silver Hammerloid finish, or it can be furnished with a flat, prime coat ready to take any matching color. Cabinet is lined with special insulating and sound absorbing material, giving quiet, efficient operation at all times. Complete control is accomplished by two small dials on the front of the cabinet.

Occupying only 5½ square feet of floor space the unit cools, dehumidifies, circulates and filters. It is adaptable for heating, too, for full year-round air conditioning.

◆

● 339—Health Draft Gauge

Detroit Air Meter Co., P. O. Box 1473, Detroit, Mich., announces the dual range Heath draft gauge, with an unbreakable transparent U tube to provide either high or low gas or air pressure readings.

When held vertically the metal scale to the right registers with the meniscus of the column of water in its adjacent tube to indicate inches of water pressure from 0 to 10 in., being graduated at 0.1 in.

When the gauge rests horizontally, as shown, the scale to the left is read with the meniscus of the inclined tube directly below to measure pressures

Detroit Air Meter

from 0 to 0.5 in. of water, the divisions being equal to 0.01 in.

A new principle is employed to eliminate the usual "reservoir error" and to permit the cancellation of "capillarity error" when low pressure readings are made. The U tube legs have similar bores with the inclined leg sloped 1 in. to 10 in., while the lower leg, after rising close to the upper, continues to the right in the horizontal plane to serve as the liquid reservoir. When air or gas pressure upon the water in the reservoir leg raises the meniscus in the inclined leg, the reservoir leg meniscus moves to the left at a constant level. Thus the vertical height of the meniscus in the inclined leg above the meniscus in the reservoir leg at once gives the gas pressure in inches of water.

The Heath Draft Gauge principle permits the construction of a simpler lower-cost portable gauge of sturdy qualities that maintains its calibration in the field. As the instrument is inherently level when the meniscus in the inclined tube is at zero on the 0 to 0.5 in. scale, the metal scales may be permanently fixed in relation to the U tube.

Special use is made of this dual range draft gauge in checking thermostatically controlled gas burners for city line pressure and for by-pass pressure which is used while idling—one Heath Draft Gauge will make both checks. Other uses include, testing fan performance; and filter, duct, grille, etc., pressure drop or velocity measurements.

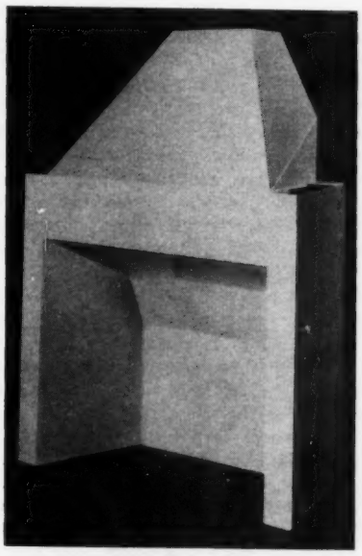
New Products . . . . . .

For your convenience in obtaining information regarding these items, use the coupon on page 92.

• 340—Circulating Fireplace

Majestic Company of Huntington, Indiana, following by only a few months the announcement of an uniquely designed circulating fireplace incorporating the Radiant Blade principle of heat radiation, announces the addition to their line of a new model as the Special model Majestic Circulator Fireplace priced low enough to put a prefabricated fireplace unit within the range of the small, low-cost home.

By circulating heat throughout the room as well as adjoining rooms, much in the manner of a furnace, it makes a fireplace efficient as well as ornamental.



It is so designed as to serve as a form around which any style of mantel, low or high, can be built, with resulting economies in materials and masons' time. Being properly proportioned, it will not smoke and insures efficient operation. Ornamental grilles of various styles to harmonize with the mantel can be furnished for the cold air intakes and hot air outlets.

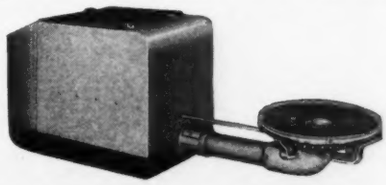
The fire chamber in this circulator is of 3/16 inch steel plate to withstand intense heat. Shell is 16-gauge steel. All joints are electric welded.

◆

• 341—Natural Draft Stoker

Frank L. Meier, President of the Meier Electric and Machine Co., 3525-35 East Washington Street, Indianapolis, Indiana, manufacturers of the Meier Nu-Air Home Cooler, announces that the company has gone into production on the Meier Natural Draft stoker for domestic purposes.

The Meier Natural Draft stoker is a radical departure in principle and design. It operates entirely on the Natural Draft principle, eliminating the fan or blower. This feature also eliminates the clinker and fly ash problems, and makes it possible to burn all fuels in stoker sizes, whether high or low fusing ash, they say. They claim that tests have shown greater



fuel economy due to lower stack temperatures. Other features claimed are greater cleanliness due to eliminating of fly ash and smoke, less attention by eliminating clinkers, automatic control, and simple installation as there are no pits to fill.

The grates are automatically revolved keeping the fuel bed completely agitated and a fast, radiating fire burning over the entire grate area. Grates are kept clean by the revolving action which sifts the ashes into receivers which can be placed in the ash pit.

The fuel is fed from below burning off the volatile matter and eliminating smoke. Drafts are automatically controlled. Mechanically the unit is quiet, rugged, economical and dependable.

◆

342—Victor Electric Drills

Stanley Electric Tool Division, New Britain, Conn., announces two new "Victor" portable electric drills, Nos. 581 and 341, designed for use by contractors, automotive mechanics,

plumbers, heating and ventilating contractors and maintenance men. Sturdy, compact, low priced, reserve power universal motors, No. 581 has a chuck capacity of 5/8 in. and No. 341 has chuck capacity of 1/4 in.

Both drills have nickel steel gears, specially heat treated, are full ball bearing, have combination breast plate and spade handle, and pipe handle which is detachable for close quarter work.

• 343—Oil Burner—Water Heater

Carrier Corporation, Syracuse, N. Y., announces two new products utilizing oil as fuel.

The Carrier oil burner reflects the air conditioning experience of the company through the distribution, direction and diffusion of air for efficiency and economy. Laboratory tests show that this burner uses 9,560 times more air than oil. Other features of the Carrier design are beryllium copper nozzle tip, safety-stat, aero-diverter, chrome nickel air tube and vane assembly and aero-dynamic fan. Sizes are available for large and small heating plants.

A leaflet describes the Carrier water heater that uses oil. One size with built-in 40-gallon storage tank heats the capacity of the tank within an hour. The other size for separate tank has a capacity of heating 50 gallons per hour. Number 2 grade oil is used. Automatic control, heavy insulation and full assembly are features of both sizes.

◆

344—Silent Flexible Couplings

The Shallcross Company, 48th & Grays Ferry Road, Philadelphia, Pa., announces a new Wood flexible coupling. The hardened steel, canvas Bakelite or rubber replaceable jaws prevent the possibility of replacing coupling halves. The center section, which is reversible—providing double wear—is obtainable with driving members of fibre, hardened steel, or with load cushion of hardened steel, canvas Bakelite or wear-resisting tire stock rubber. (Neoprene, oil-resisting compound, is obtainable.)

Parallel or lateral displacement or shafts up to .0625 without impairing the efficiency of the coupling; angular displacement of at least 10 degrees without effect; and resiliency are features claimed.

There are no solid contacts. All Wood couplings drive through floating, insulated center member. They are suitable for high speeds and not effected by high heats and are silent in operation due to the insulation of the center member.

New Products . . . . . .

For your convenience in obtaining information regarding these items, use the coupon on page 92.

345—Metal Spray Gun

The Turner Brass Works, Sycamore, Illinois, presents a new metal spray gun, fully patented, for all lead-tin alloys. Heat is furnished by a blow torch operating at low fuel cost on low air pressure and volume. Any

standard rods or bars of solder may be used. Control of spray from fine to coarse is instantaneous, with a reserve of molten metal to maintain temperature under heavy use, they say.

The Turner metal spray gun fills the requirements for rust proofing, fire protective covering, and corrosive protection.

◆

346—Sheet Metal Roofing

The Newport Rolling Mill Company, Newport, Kentucky, has designed the new Globe Rain Drain sheet metal roofing, cross-section view of which shows how seepage up be-

tween sheets at overlap at base of courses is prevented by interposing an Air Lock (3) in the path of the water as it rises. The Air Lock is rolled into the sheet one inch up from the base, and extends up into and over the crimps, forming an unbroken barrier against capillary attraction across the width of the roof at every course.

Water that may be blown up under sheets at side laps is quickly conducted to the eaves by the Rain Drain Channel (1) rolled into the outer crimp.

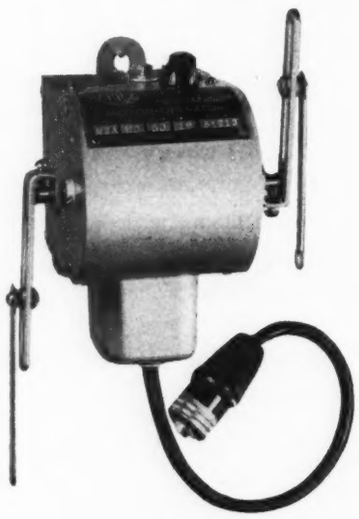
Other points of interest in Rain Drain Roofing are the improved Triple Dome Crimp (2); the Nail Seat (4), rolled into the Air Lock Bead to provide for extra nailing; the Snug Fit Edge (5) bent downward ⅛ inch to form tight, pressure contact with under sheet; the Self-Aligning Ridge (6) a continuation of the Air Lock Bead, makes for quicker laying and alignment of courses and (7) the almost vertical supporting leg under overlapping crimp provides greater rigidity for nailing.

Matching ridge roll, flashings and other fittings are also produced with the Rain Drain Roofing features.

◆

347—Friez Motor Operators

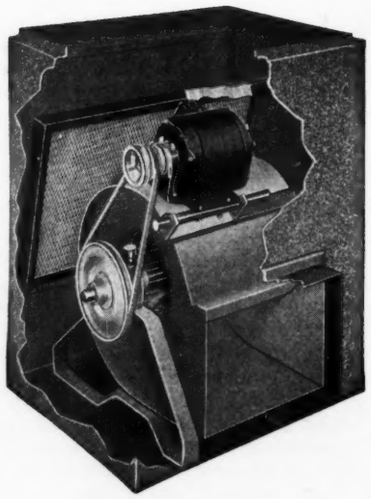
Julien P. Friez & Sons, Division of Bendix Aviation Corporation, Baltimore, Maryland, announces the new Friez motor operator (or damper motor). This new operator is employed to give effect to the automatic control provided by Thermostats, Aquastats, Pressurestats, Furnacestats, Humidistats, Comfortrols (effective



temperature controllers), and similar sensitive instruments themselves without recourse to electrical relays. The motor operator is used on low voltage which is furnished to the control circuit and the motor by the secondary of a simple transformer which is supplied with each motor operator from 110 V. or 220 V., A.C., supply lines, according to specifications.

These new operators are provided with auxiliary hand switches giving manual "on," "off," or "automatic" positions and, also, with arms which are adjustable in position and which are in turn connected to the draft damper of coal-fired furnaces or boilers, to the duct dampers of air conditioners or warm air systems, to zone dampers, by-pass dampers of conditioners, etc.

Many types are available for 3-wire or 2-wire applications and with built-in or separately mounted transformers. Various accessory arrangements are also included in different types according to the application.



348—Rex Air-Pak

Air Controls, Inc., Cleveland, announces a new, completely assembled, ready to install, Junior blower-filter unit for converting gravity warm air furnaces into air conditioning systems.

This Junior model is designed for use on furnaces up to and including the 24-in. firepot and is priced within the reach of the modest family budget. The streamlined cabinet is small and compact and will easily pass through the average doorway. Inside the cabinet are two 20x25 filters, a 12-inch blower wheel and a ¼ h.p. Century split phase motor.

By means of a four-speed motor pulley, air capacities can be adjusted from 1220 to 2300 c.f.m.

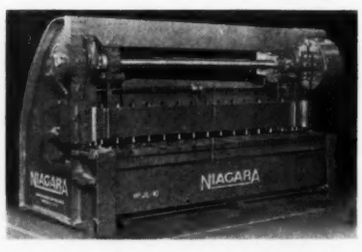
A deep throat on the blower casing eliminates the need of a cold air connector or boot.

A door is removable for access and to admit basement air for summer cooling. Dimensions are 26½ ins. in depth, 32 ins. in width and 37¼ ins. in height.

◆

349—Power Squaring Shears

Niagara Machine & Tool Works, 637 Northland Ave., Buffalo, announces the series "JL" power squaring shears for ¼-in. capacity in several standard cutting lengths.

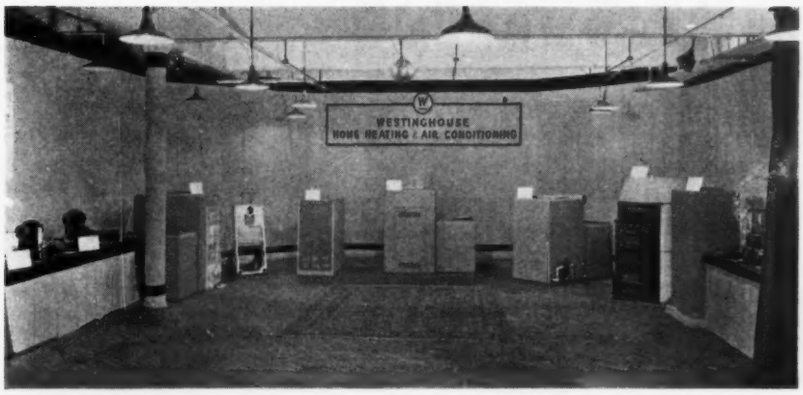


The drive is enclosed with gears mounted on anti-friction bearings and running in oil.

These shears are completely accessible at the rear for convenient setting of back gage and easy removal of sheared pieces, and are engineered to fit the requirements of industry for cutting, fast handling of sheets, safety and low maintenance cost.

New Products . . . . . .

For your convenience in obtaining information regarding these items, use the coupon on page 92.



350—Westinghouse Complete Line

Westinghouse has just announced the addition of home heating and air conditioning equipment to complete a line including oil, gas, and coal-fired winter air conditioning units suitable for the addition of summer cooling equipment; hand-fired coal gravity warm-air furnaces offering both steel and cast-iron construction; and an automatic gravity gas-fired warm-air furnace. The new Westinghouse line now covers every phase of market requirements from low-price models through to deluxe completely automatic year-around home heating and air conditioning system and including "zone control" of temperature for large, unusual heating conditions.

The complete line now consists of:

1. For the mass replacement and new-home market:
   a. Cast-iron coal-fired gravity furnaces in seven sizes, ranging in capacity from 336 to 907 square inches round pipe
   b. Heavy-duty steel coal-fired gravity furnaces in six sizes in capacity ranging from 537 to 1229 square inches round pipe
   c. Normal-duty steel coal-fired gravity furnaces in four sizes, ranging in capacity from 334 to 581 square inches round pipe

   All of the above gravity furnaces are convertible for use with gun-type or rotary oil burners, or stokers.
   d. Gas-fired gravity steel furnaces, ranging in register capacity from 51,000 to 128,-900 Btu
2. For the larger new-home and higher-income replacement market:
   a. Oil-fired boiler-burner units for steam, vapor and hot-water, ranging in capacity from 375 to 1040 square feet of steam, and 600 to 1664 square feet of hot-water radiation
   b. Gas-fired boiler-burner units for steam, vapor and hot-water, ranging in capacity from 375 to 1040 square feet of steam, and 600 to 1664 square feet of hot-water radiation
   c. Series 5500 coal-fired winter air conditioning units, with steel heating elements, convertible for stoker, rotary or gun-type oil burners, ranging in capacity from 76,000 to 143,000 Btu
   d. Series 20 coal-fired winter air conditioning units, with cast-iron heating elements, ranging in capacity from 95,000 to 153,000 Btu (Convertible to oil or stoker firing)
   e. Series 80 coal-fired winter air conditioning units with steel heating elements, in five sizes ranging from 103,000 to 222,-000 Btu
   f. Series 1100 "deluxe" oil-fired air conditioning units, in six capacities ranging from 101,000 to 331,000 Btu
   g. Series M gas-fired winter air conditioning units with steel heating elements in four sizes, ranging from 61,000 to 153,-000 Btu
   h. Series D "deluxe" gas-fired air conditioning units with cast-iron heating elements, in four sizes, ranging from 107,-000 to 267,500 Btu capacity
   i. Series 720-R oil-fired air conditioning unit with rotary wall flame burner, capacity 75,000 to 100,000 Btu
3. For the small-home and apartment market:
   a. Vertical-type gas-fired winter air conditioning units offering individual control of comfort to the apartment; and small-space high-quality winter air conditioning to the small home, with or without a basement
4. For the conversion market:
   a. Conversion oil burners (Westinghouse Spiralaires) in a capacity range from one to five-gallons per hour, for application to existing warm-air furnaces
   b. Blower filter units ranging in capacity from 500 to 6500 cfm to convert present gravity furnaces into modified winter air conditioners
   c. Spray-type and drip-type humidifiers to complete conversion of existing warm-air installations to winter air conditioning
   d. Complete temperature and humidity controls for the above
5. For summer air conditioning:
   a. The RU-90 cooling unit of approximately 3-ton capacity. It may be installed in the supply duct of any central duct system equipped with adequate blower and filter equipment, and may be applied in multiple when needed to supply additional capacity
   b. Air-cooled and water-cooled room coolers
   c. Ceiling-suspended type packaged cooling units of 1-ton capacity.

◆

351—Electric Furnace Cleaner

Carl E. Swift Corporation, Holland, Michigan, has developed a new suction cleaner, powered by electricity, for removing soot and fly ash from furnaces, chimneys and boilers.

Soot is well-known as an effective heat insulator. It is claimed that one-eighth inch of soot upon one-quarter inch of cast iron will reduce heat conductivity by radiation as much as 50 per cent. To manufacturers, this

means reduced heating-plant efficiency; to home owners, it means a waste of fuel with a lack of heating comfort; to coal dealers, it means a lot of complaints about "poor coal."

Driven by a General Electric 1725-rpm., a-c repulsion-induction motor, the Swift cleaner is a self-contained unit built into a small trailer about eight feet long. The suction bag, when inflated, is 33-feet long and six feet in diameter.

An unusual-type fan arrangement is employed in the equipment. Two sets of blades, one straight and one curved, are used. The straight blades, which are of small diameter, are so arranged that high velocity air movement is obtained at the intake with extremely low power input. The air is then picked up by the curved blades, which have a larger diameter, and discharged through an orifice of such dimensions that back pressure is avoided.

All flexible hose, metal pipe, brushes, scrapers, and other necessary accessories are furnished with the unit.

◆

352—New Air Conditioner

Fluid Heat Division of Anchor Post Fence Co., Baltimore, Md., has developed and placed on the market a new furnace with winter air conditioning. The exchanger is made from heavy steel plates with two unique upper chambers which provides an unusually large secondary heating surface. The special Fluid Heat combustion chamber has its rear member ex-

tended so that the flame cannot impinge on the metal surface.

The entire unit has been designed to get the best efficiency while making all parts easily accessible. The insullation is 3-ply air-cell asbestos with aluminum foil surface. Crinkle finish in neutral tan with green trim is used on the jacket. Burner used is the standard Fluid Heat pressure job. The air conditioner is made in three sizes having bonnet ratings of 100,000, 170,-000 and 215,000 Btu hr. Blower capacities are based on the standards of the new warm air technical code.

New York State

The New York State Sheet Metal, Roofing and Air Conditioning Contractors' Association, Inc., annual convention is to be held at the Ten Eyck Hotel in Albany on March 2, 3 and 4.—Clarence J. Meyer, Secretary.

◆

Illinois

The Sheet Metal Contractors Association of Illinois, as a result of meetings of officers and directors, will hold their annual convention at the Jefferson Hotel, Peoria, on January 18 and 19.

The Program Committee is getting together material which the officers and directors feel will be of great interest to all sheet metal contractors. A nice assortment of attendance prizes is also being assembled.

The association is making a membership drive. Application blanks are available, with the slogan "Get Together! Work Together! Plan Together! Pull Together!" One of the objects of the State association is to bring together in the different cities the firms engaged in the sheet metal business and organize them into a local trade association. The local association is strictly a business proposition and has for its objects, securing and maintaining better prices, eliminating the sale of supplies direct to the consumer by the jobber, establishing harmonious trade relations among competitors and in many ways promoting the sheet metal business. The Travelers Auxiliary is working very closely with the Illinois association and is helping to secure contractor association members.

Ralph W. Poe, Secretary.

◆

Wisconsin

The Board of Directors and members of the Master Sheet Metal, Heating, Ventilating and Air Conditioning Contractors Association, Inc., of Wisconsin, held a meeting at Room 108, 225 East Michigan Street, Milwaukee, on November 11, called to order by President R. F. Gehrke.

Chairman Kramer outlined his plan for the enlarged membership committee during the Annual convention, to be active during and after each session. New members accepted were The Northern Metal & R. Co., Badger Sheet Metal & Furnace Works of Green Bay, Martin Peterson of Kenosha.

Those present voted that the secretary should attend the Secretaries Conference at Gary, Indiana, on November 19 at the Gary Hotel. It was suggested that others should attend this meeting.

Member Kramer of the Convention Committee reported that arrangements are completed for entertainment, booth rentals, badges, etc., that advertisements are coming in, and that consideration and thought is being given to formulating the program. Associationship, advertisement and Government agencies were subjects pertinent to the industry considered for a speaker to be engaged for the Annual Convention.

Paul L. Biersach, Secretary.

St. Louis

The Associated Sheet Metal, Air Conditioning and Heating Contractors of St. Louis, Incorporated, has adopted an emblem and one of the St. Louis jobbers has written on the value of organization, extracts of which follow:

Any class of business must have a means of developing ethics and proper methods, as applied to that particular business, can be accomplished only by an association. An individual is helpless to correct the ills and supply the cure for a class of business. If a member of an association, joining his thoughts and methods with the thoughts and methods of fellow members makes possible a better understanding, a better service to the public and better profits.

Approximately ten per cent of the human element of the St. Louis trade has just finished a fine piece of work. An emblem has been developed and is in use, typifying the industry. The emblem is issued only to members of the St. Louis association and only over a pledge by that member to use quality materials and to do quality workmanship. Provisions are being made to prevent its misuse and to promote its true purpose. The emblem will be advertised before the public eye until it is known that the emblem represents a guarantee of workmanship backed by an association of high merit. A committee and alternates will be appointed to serve as a sort of jury to hear and consider any and all complaints emanating from fellow members or the public. The association is sole owner of the emblem, and it is only loaned to any member so long as he conducts himself and his business in accord with the dictates of the association, and upholds the sanctity of the emblem. Steps are in progress to have it copyrighted. Each member is registered and numbered, and it is so printed or painted on the emblem in his trust.

This emblem will appear at the head of the classified list in the telephone directory, or any other directory, over the names of the members permitted to use it.

The St. Louis association hopes that the emblem will be used nationally. If so, it will be issued only as prescribed by the St. Louis association, and will remain the property of the St. Louis association.

The trade should be proud that they have men in their circle who spend many hours and some dollars in an earnest effort to improve the business conditions for others and themselves. Approximately 10 per cent of the local trade is responsible for the emblem. If it takes but 10 per cent to do this, can you conceive what could be done if 70, 80 and 90 per cent of the shop owners would attend the meetings?

H. Weis, Secretary.

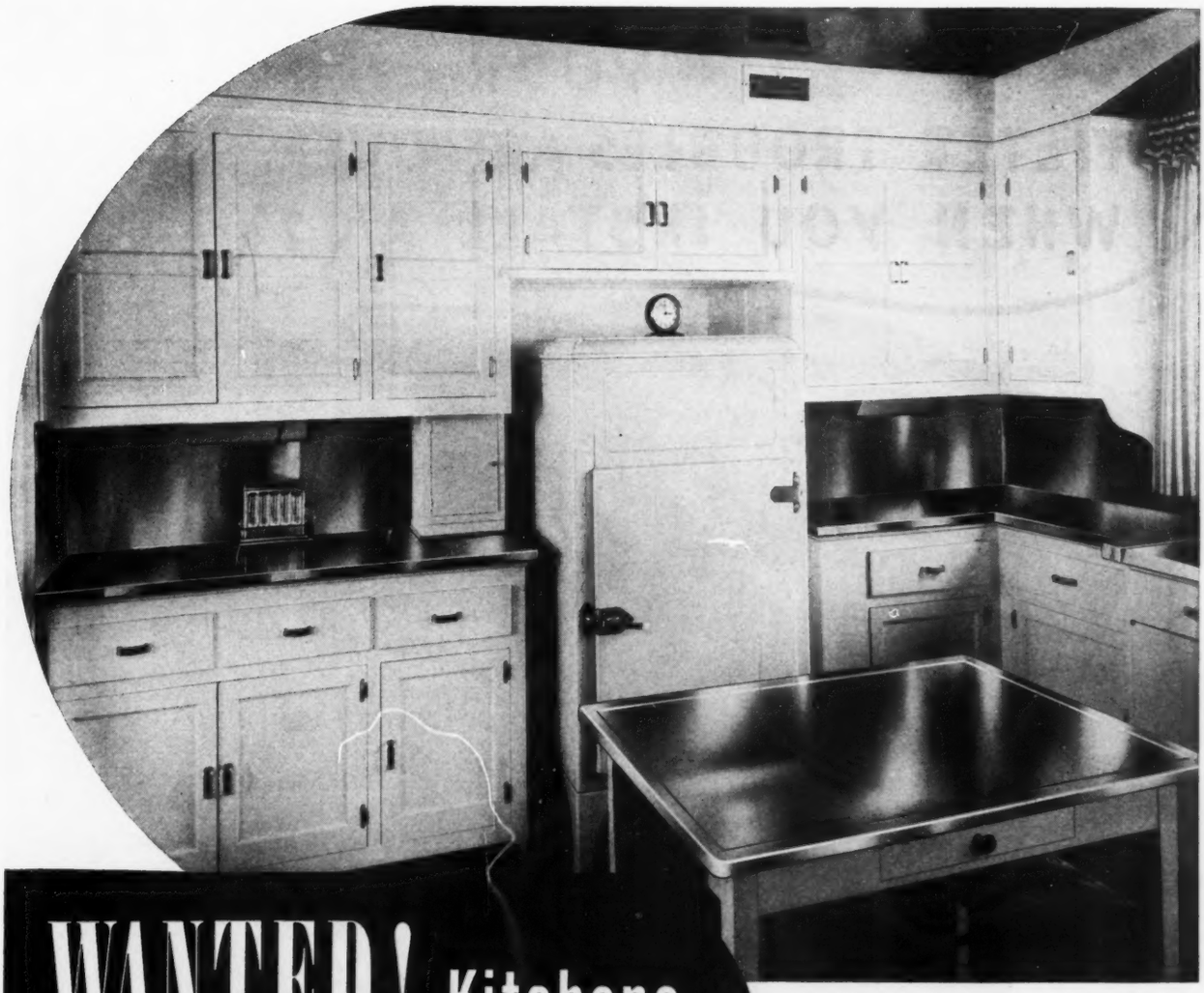
◆

Chicago

The Furnace and Sheet Metal Institute held Milcor Nite on Thursday, November 10. The speaker of the meeting was Bob Schmieder, Milwaukee, who gave a very interesting talk on "Extra Profit Work Available to the Sheet Metal Contractor."

Beer and sandwiches were served through the courtesy of The Institute and Milcor.

A cordial invitation was extended to all to attend the Annual President and Ladies' Nite on December 3.



WANTED! Kitchens that make Work a Pleasure

Note Armco Stainless Steel work boards. Similar boards are on either side of the sink. And all of them were installed by a sheet metal contractor.

Today's standards demand beauty, cleanliness and easier working conditions in the kitchen. Women *want* these features and are willing to pay for them. You can help meet this demand and make profitable sales with Armco Stainless Steels.

Here is a metal that will not tarnish nor discolor. Its beautiful lustre is unaffected by food acids. It is not easily dented or scratched. Year after year Armco Stainless will retain its original beauty. Plain soap and water will keep it bright and shining for many years, all of which housewives appreciate.

You will find that Armco Stainless Steel forms easily and quickly. It can be soldered or welded without trouble. Recommend and use it for drain boards, sinks, work surfaces . . . wherever permanence, beauty and sanitation are desirable. The nearby Armco distributor can quickly supply you the right grade of Armco Stainless. Consult with him on shop or sales problems, or write direct to us. The American Rolling Mill Company, Executive Offices: Middletown, O.

ARMCO

ARMCO STAINLESS STEELS

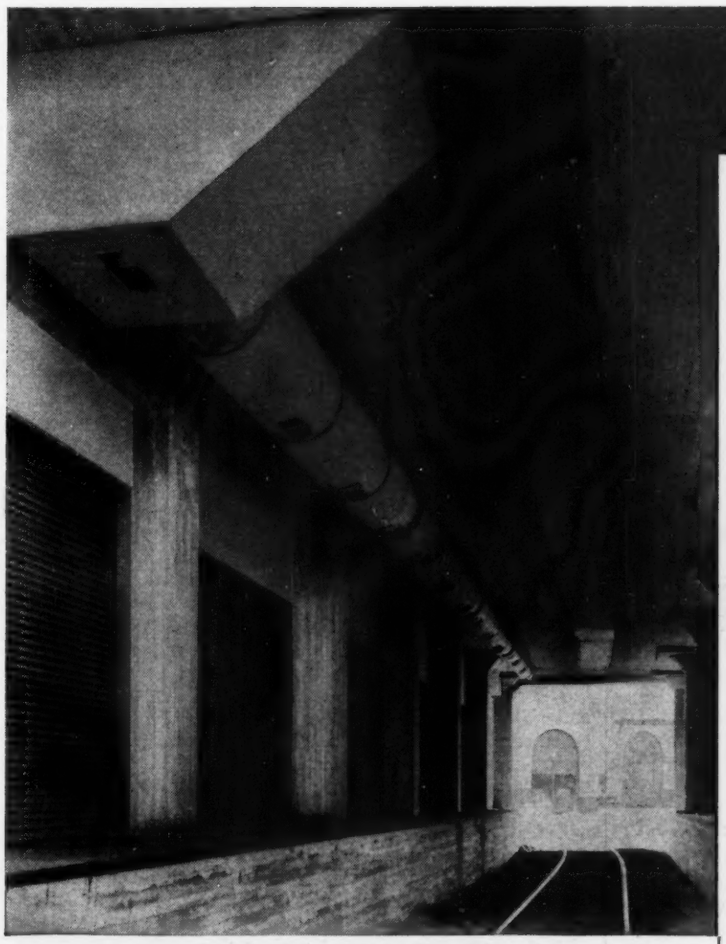
YOUR FILTER TROUBLES ARE OVER WHEN YOU INSTALL A/C 2's

THE A/C-2 is a permanent — washable — low-priced filter. When it has accumulated its full dust load—it can be easily cleaned by first rapping it on the floor, dirty side down, to remove the bulk of dirt and then washing out the residue by holding the filter under a hot water outlet. After spraying the filter with viscosine at a cost of less than 5c it is again ready for service.

Write for Bulletin No. 117-E which will be sent without obligation.

AMERICAN AIR FILTER CO., INC.
Incorporated
102 Central Ave., Louisville, Ky.
In Canada: Darling Bros., Ltd., Montreal, P. Q.

AMERICAN AIR FILTERS



"SANTA FE" selects Everdur for ventilating ducts

Picture shows ducts of Everdur installed in recently constructed Atchison, Topeka & Santa Fe Railroad's warehouse, San Francisco, for removal of highly corrosive locomotive fumes. This reinforced concrete building with double track railroad tunnel for engines to enter and switch cars was designed by P. C. Kangieser under Chief Engineer M. C. Blanchard's supervision. Everdur Metal was selected for duct construction only after exhaustive studies of corrosive conditions proved that it was the most desirable metal for the job. Installation was made by James A. Nelson Company, Inc., San Francisco, using approximately 6500 lbs. of Everdur sheets in 18 and 20 U. S. Gauge. Some seams were riveted and others welded. Riveted seams were sealed with brazing alloy.

Where Humid Air or Fumes cause Corrosion...

Consider Everdur Metal for the Job

SINCE EVERDUR offers excellent resistance to numerous corroding agents...moist air, sulphuric acid fumes, locomotive exhaust, and many others... it has economic advantages wherever metal ductwork is subject to such conditions. Furthermore it is easy to work, and is readily welded. This combination of durability and workability explains why Everdur has been used for ducts in many of the country's outstanding buildings.

Tell Your Customers These Facts: The problem of rust in air-conditioning installation is bound to arise sooner or later, for moisture in humidified air is corrosive. Thus, unless the metal used for ducts is rustless, high-cost replacements may eventually be needed.

Unusual Installations—It must be remembered that no metal is equally resistant to all forms of corrosion. Our Service Engineering Department is prepared to cooperate with contractors in determining the most suitable metal for ducts which will be subjected to the unusually corrosive actions of chemical fumes, etc. This service involves no obligation of any kind.

38128

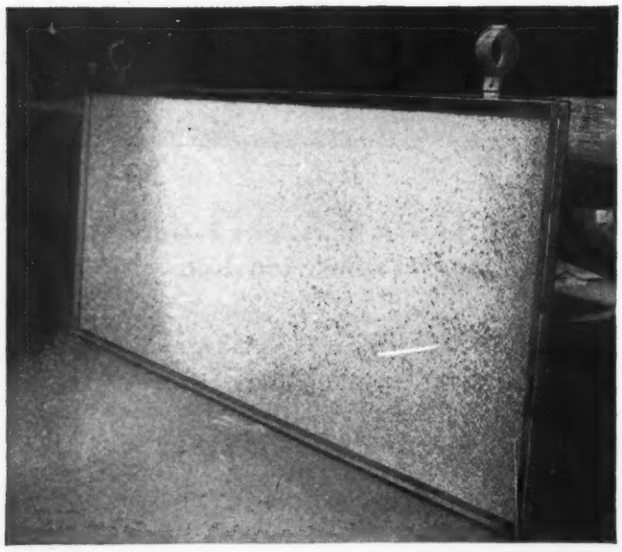
Everdur Metal

ANACONDA

THE AMERICAN BRASS COMPANY, General Offices: WATERBURY, CONNECTICUT

In Canada: ANACONDA AMERICAN BRASS LTD., New Toronto, Ont. • *Subsidiary of Anaconda Copper Mining Company*

"EVERDUR" is a trade-mark of The American Brass Company, registered in the United States Patent Office.



A GOOD SIGN... BUILT IN HALF THE TIME *with a* LINCOLN WELDER

● Mr. Bain, of the Bain Sheet Metal Shop, Tulsa, Okla., says that while other sheet metal shops may feel the business depression, he has brought in specialty lines by means of his Lincoln arc welder so as to maintain good business volume. These specialties include machine guards, canopies for portable machines such as compressors, oil well mud samplers and signs such as illustrated.

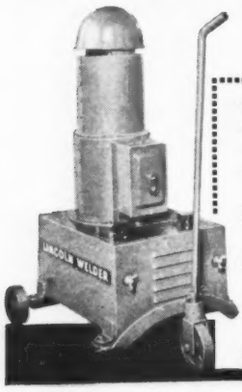
"It's profitable work too," says Mr. Bain. "For instance, we build these signs simply by welding two angle irons back-to-back around the edge of a galvanized sheet, then attach two hangers made from strap. We turn them out in half the usual time at a good saving in cost."

You too will find it highly profitable to own a Lincoln Welder. With this DC motor generator type welder, you can fabricate all metals and alloys speedily and at low cost. Moreover, you will be able to manufacture products of improved design, maximum strength, minimum weight and pleasing appearance.

The Lincoln Welders preferred by most sheet metal shops (in ratings of 75, 100 and 150 amps.) are priced at less than $200. For complete details consult the nearest Lincoln office or mail the coupon.

THE LINCOLN ELECTRIC COMPANY

Largest Manufacturers of Arc Welding Equipment in the World



THE LINCOLN ELECTRIC CO.
Dept. EE-554, Cleveland, Ohio

Send free copy of Bul. 314 and payment details on the Lincoln Sheet Metal Shop Welder.

Name _____ Position _____

Company _____

Address _____

City _____ State _____

Association Activities . .

Roofing Contractors

Born in 1887, the United Roofing Contractors Association, oldest building trade association in the United States, expects to eclipse its previous annual industry meetings with a record breaking 52nd Annual Convention scheduled to open at the Wardman Park Hotel, Washington, D. C., on February 8th, 1939.

According to Tom Daly, President of the national association, the sessions will occupy three days. Among the speakers will be a Congressman, who claims to be the only roofing contractor elected to Congress. A unique feature of the 1939 Convention will be a "Roofing Odditorium."

The "Roofing Odditorium" consists of a collection of exhibits showing in pictorial form the history of the different types of roofing and odd facts of the Ripley believe-it-or-not description associated with roofing. These have been gathered by roofing contractors, jobbers and manufacturers. Contractors and others who possess photographs or material for inclusion can have their material considered by writing the Convention Committee, 52nd Annual Convention, United Roofing Contractors Association, 175 Fifth Avenue, New York, N. Y. A prize will be awarded for the best contribution to the "Roofing Odditorium."

Through the cooperation of the Department of Commerce, the Convention delegates will be taken behind the scenes to witness the Bureau of Standards' tests on roofing materials—tests which determine the rigid Government specifications on roofing materials and their application.

In previous years convention programs have emphasized the employment of quality materials, the necessity for skilled workmanship and other subjects. The 1939 program will feature discussions on the mechanics of operating a roofing contracting business at a profit. It has always been the policy of the Association to learn by mistakes, but preferably by the "other fellow's" mistakes. The "other fellow's" mistakes will be listed at the convention together with the measures to guard against them.

Ohio

The officers and Board of Directors of the Ohio Sheet Metal Contractors Association met on November 29th and voted to hold the 1939 convention at the Hotel Portage, Akron, Ohio, on February 14, 15 and 16.

Oscar Hodgson, 987 Wooster Road, Barberton, is chairman and H. L. Orton, 321 Washington St., Akron, is vice-chairman.

Harry Hollman and Lee W. Gillespie, president and secretary of the Ohio Sheet Metal Salesmen's Auxiliary have been notified of the dates and will lend their aid in the work of formulating a successful, well attended convention.

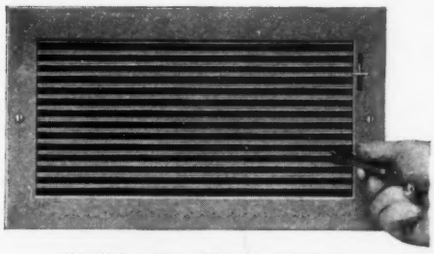
The members of the Akron convention committee are holding a general meeting of all committees within the next few days and the wheels will begin to hum.

Akron entertained the Ohio Sheet Metal Contractors in 1932 at a very successful convention and the boys announce that the 1939 meeting will be "bigger" and "better"—that all they ask of the Ohio members and friends is to remember the dates. Special low rates will be given by the hotel for the convention.

C. M. Gundlach, Secretary.

Chicago

Another of the bi-monthly meetings of the Master Furnace & Sheet Metal Association was held Monday night, November 7th. President John Spitzer opened the meeting and introduced Howard Mason, Art Meiche of Furblo and Ed Carter of Snips. Mr. Mason presented the association with several books to start a reference library and urged the members to make good use of them. Ed Carter introduced Frank Roberts and Jack Clark of Detroit who spoke on the wage and hour law, and the need for mechanics in the industry. Others present taking part in the discussions were D. C. Ellison, Paul Barth, Grant Wilson and John Novak of the North Side Association.



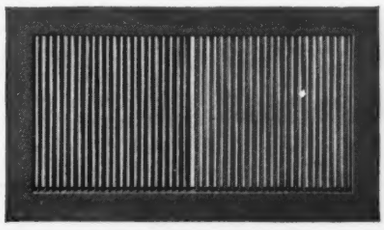
Fin-Flex fin adjustment is accurate and easy

Beauty and Efficiency

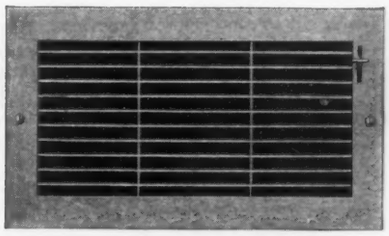
Distinguish These New Air Conditioning Registers

Subject to proper strength and pleasing appearance, *every possible square inch of free air space* has been preserved in these new Auer Air Conditioning Registers. Fin-Flex fin adjustment is made at time of installation—and is *positive*. Fin-Flex and Dura-Flo Registers and grilles represent the finest value AUER has ever been able to offer. Auer's complete line can now take care of *all* your needs.

● *Auer Air Conditioning Register Book now ready — ask for your copy.*



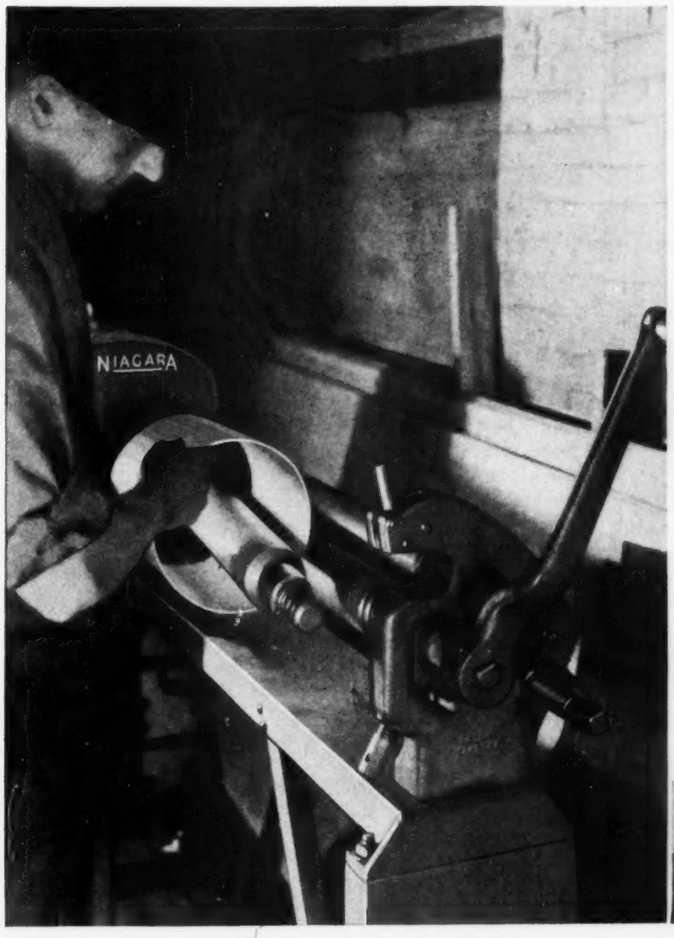
Fin-Flex Grille with vertical fins



Auer Dura-Flo Register

THE AUER REGISTER COMPANY, 3608 PAYNE AVENUE, CLEVELAND, OHIO

AUER DISTINCTIVE REGISTERS & GRILLES For Air Conditioning *and* Gravity



NOW . . . . QUICK, SAFE, TRIGGER OPERATION with NIAGARA SLIP ROLL FORMERS

Instant release of slip roll with horizontal swing gives you fast, easy, safe operation when forming cylindrical products. Built in a complete line of hand and power operated models for various lengths and thicknesses of materials. Write for Bulletin.

NIAGARA MACHINE & TOOL WORKS

637-97 Northland Ave. Buffalo, N. Y.

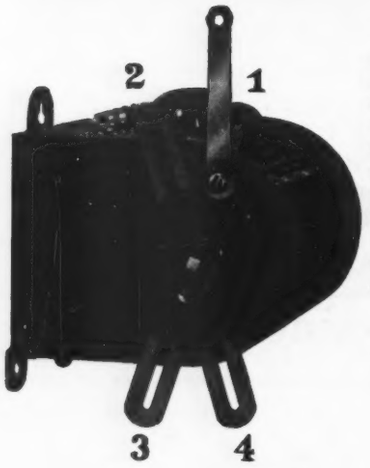
Leader Bldg., Cleveland, O. General Motors Bldg., Detroit
50 Church St., New York

NIAGARA

A NEW DEVELOPMENT

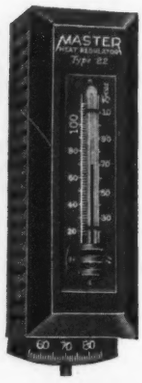
in controls for hand fired furnaces with circulating blowers

Master Tripltrol



The main feature of this system lies in the flexibility of the Master damper motor which will take any one of the three positions when the room thermostat calls for heat. In one position the draft only is on, in another the draft and fan, and in the third the fan only.

BOTH SUMMER AND WINTER CONTROL



Built especially for hand-fired furnaces with blowers, this control is also applicable to hot water heating systems with circulators. The Tripltrol System recognizes the need of functioning from three definite temperatures encountered in the bonnet of a furnace. Through cooperation between room thermostat and bonnet control it coordinates the action of the circulating blower and draft dampers to perfectly meet every condition.

For full information write for Bulletin 900

WHITE MFG. CO.
2362 University Ave. St. Paul, Minn.

MASTER HEAT REGULATOR

Milwaukee

The Master Sheet Metal, Heating, Ventilating and Air Conditioning Contractors Association, Inc. of Milwaukee, met on November 7 at Guild Hall, Republic Hotel, Milwaukee, Wisconsin.

President Frank Kramer called the meeting to order with 21 members present. The speaker of the evening was C. Graeber, talking on "Developments in the Apprentice Training in Our Industry," analyzing the procedure at the Milwaukee Vocational School, of which he is Apprentice Coordinator. Norvin Rogerts, Instructor, also addressed the meeting.

Chairman Angelo Hoffmann of the Apprenticeship Committee stated that his committee had been in session during the past few months with representatives of the Industrial Commission and the Milwaukee Vocational School. It will be their aim to standardize and simplify the apprenticeship contracts so that they will be more economical and advantageous to the employers and equally so to the apprentices.

Member Groeschel's decease was recognized by the chair requesting all those present to rise with bowed heads.

Paul Biersach, Secretary.

Coming Conventions

1939

Jan. 18-19—Sheet Metal Contractors Association of Illinois. Annual. Jefferson Hotel, Peoria. Ralph W. Poe., Secretary, Canton, Ill.

Feb. 3-4—Sheet Metal, Warm Air Heating and Roofing Contractors' Association of Indiana, Inc., Annual Convention and Educational Program. Purdue University, Lafayette, Indiana. Paul R. Jordan, Executive Secretary, 631 S. Delaware, Indianapolis.

Feb. 6-8—Master Sheet Metal, Heating, Ventilating and Air Conditioning Contractors Association, Inc., of Wisconsin. Annual. Plankington Hotel, Milwaukee. Paul Biersach, Secretary.

Mar. 2-4—New York State Sheet Metal Roofing & Air Conditioning Contractors' Association. Annual. Ten Eyck Hotel, Albany, N. Y. Clarence J. Meyer, Secretary, 567 Genesee St., Buffalo.

Milwaukee

The secretary's annual report as of December 1, 1938, for the Master Sheet Metal, Heating, Ventilating and Air Conditioning Contractors Association, Inc., of Milwaukee, Wisconsin, states that there were 57 active members at the beginning of the year, to which 15 were enrolled, two were stricken for non-payment of dues and two deaths, so that there is now an active membership of 70.

At the beginning of the year there were 13 associate memberships, to which 5 were added throughout the year, totaling 18 at this time.

There are 4 honorary members, so that the total membership amounts to 92. The average attendance was 33 individuals representing 30 firms during the eleven months. A membership roster has been issued each year for office use of members.

The Board of Directors engaged speakers for education purposes which dovetailed into the industry.

The Legislative committee contacted the architects for the purposes of persuading them to specify all sheet metal work separately and not in with other crafts.

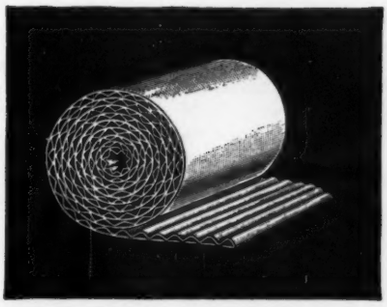
Chairman Mantei and his Workmen's Compensation Committee attended meetings called by the Wisconsin Compensation & Inspection Bureau and reported from time to time.

Trade Relations & Policy Committee met with material salesmen to correct practices unwarranted in their respective fields.

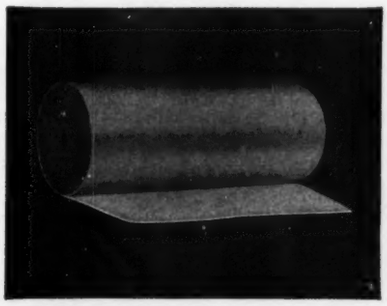
Special Committee has been appointed to see Building Inspector Gurda in regard to single stacks.

Paul L. Biersach, Secretary.

SAL-MO ASBESTOS PRODUCTS

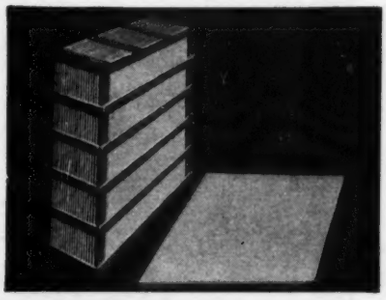


Asbestos AIRCELL and MULTICELL PAPER—250 square feet per Roll.
AIRCELL SHEETS and BLOCKS—in Standard and Special Sizes.



Asbestos PAPER and ROLLBOARD—in Standard weights and widths.
Asbestos PIPE-JOINT TAPE—in 2-inch and 3-inch widths.

Asbestos FURNACE CEMENT—Made from the best grades of asbestos fibre and the finest, high temperature refractory fire clays. Easy to apply, binds and hardens quickly, forms a perfect joint with all metals, fire-brick and stone. Will not crack or shrink.



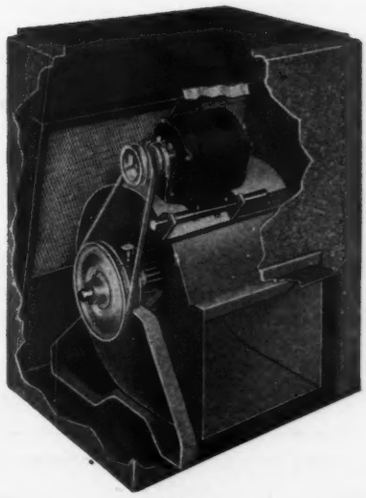
Asbestos MILLBOARD—in Standard sizes and thicknesses and special sizes cut to order.

WRITE FOR PRICE LIST AND CIRCULARS

SALL MOUNTAIN COMPANY
176 West Adams Street **Chicago, Illinois**

REX AIR-PAK

NEW JUNIOR NO. 120



Completely Assembled! Ready to Install!

- Priced within the reach of the most modest family budget.
- 12-Inch blower wheel. 1/4 h.p. Century motor.
- 1000 sq. ins. of filter area.
- Four speed pulley. Air capacities can be adjusted from 1220 CFM to 2300 CFM.
- Deep throat on casing eliminates the need of a furnace cold air connector.
- For use on furnaces up to and including the 24-inch.

Mail This Coupon for Complete Information

AIR CONTROLS, Inc.
Div. of The Cleveland Heater Co.
1933 West 114th, Cleveland, Ohio

Name .....

Address .....

City ..... State .....
A.A. 11-8

With the Manufacturers . . .

Reindel Detroit District Manager

George Reindel, Jr. has been appointed District Manager of The Emerson Electric Mfg. Co., Incorporated, located in the Stormfeltz-Loveley Building, Detroit.

◆

Crise New York Representative

Crise Electric Mfg. Co., Mt. Vernon, Ohio, has opened up an office at 202 E. 44th St., New York City. Morse Boulger Destructor Co., at this address, are direct factory representatives for the Crise controls.

◆

Henry M. Reed

Henry M. Reed was elected chairman of the Board and president of the American Radiator and Standard Sanitary Corporation, New York City, and chairman of the Board of the American Radiator Company, on November 17. He will continue as president of the Standard Sanitary Mfg. Co.

◆

Bowen Represents Penn Eectric

D. J. Bowen, who represents Penn Electric Switch Co. in Oklahoma, Texas, Arkansas, and Louisiana, is now located at 2211 Commerce Street, Dallas, Texas.

Included in the lines handled is a complete line of Penn controls for refrigeration, air conditioning, heating, and pump and air compressors.

◆

Anthracite Conference

Prof. Howard Eckfeldt, Chairman, Committee on Arrangements for the second annual Anthracite Conference to be held at Lehigh University, announces that the conference would be held on April 28 and 29, 1939, at Packard Memorial Hall, Lehigh University, Bethlehem, Pa.

The first conference held last spring aroused considerable interest in engineering and merchandising circles, and it was decided to make the meeting an annual affair. Prof. Eckfeldt announced that invitations had been sent to a group of prominent authorities to present papers at the next conference, and he expected one hundred per cent acceptance.

◆

Lewis B. Swift Succeeds Herbert J Winn

Herbert J. Winn, retiring president of the 87-year-old Taylor Instrument Companies, becomes Chairman of the Board of Directors and is succeeded in the presidency by Lewis B. Swift who has served as vice president in charge of Engineering and Research. Karl H. Hubbard has been appointed chief engineer, in charge of Engineering Research and Design and Dr. H. L. Mason will succeed him as head of the Research Division.

Mr. Winn, retiring president, has been with Taylor nearly 46 years, and has served as president and treasurer for 25 years.

Other officers chosen by the board of directors include: vice presidents, P. Richard Jameson, Henry W. Kimmel and Fred K. Taylor; treasurer, Herbert J. Noble; secretary, Henry W. Kimmel; assistant secretary, George H. Taylor.

◆

Tanner Merges with Copper Products

Dick Tanner, Inc., 226 Fifteenth St., Denver, Colorado, merged with Copper Products Company, 1549 Broadway, Denver, in June.

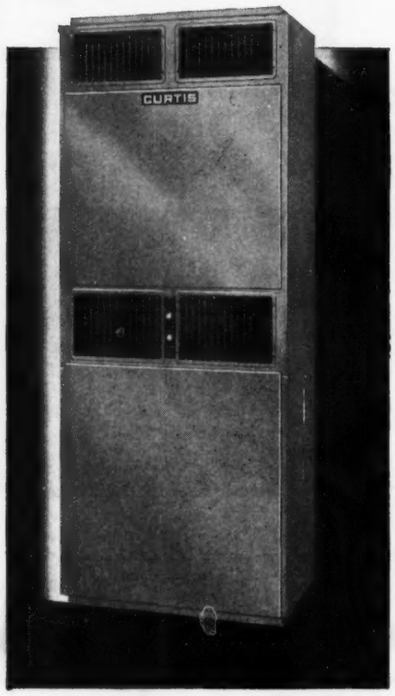
Copper Products Company was incorporated in June with 10,000 shares of capital stock, all paid in, as a closed corporation, to do a strictly wholesale jobbing business. Officers are: I. F. Lowry, president; Dick Tanner, vice-president; A. Trevorrow, secretary-treasurer; and W. B. Lowry, chairman of the Board of Directors.

The concern specializes in air conditioning equipment in Wyoming, Colorado, New Mexico and Arizona. Ben Marsh, engineer, is in charge of the engineering force. At the present time, the company is manufacturer's agent and wholesale distributor for Airtemp, Anemostat air diffusers, Cheviron furnaces, Peerless stokers, Rubberseal copper.

Announcing the New **CURTIS**

Store and Office Cooler

a new Money-Maker for you!



● The new Store and Office Cooler is the latest addition to the Curtis line of air conditioning and refrigeration equipment. It is a complete, packaged air conditioning unit, factory designed and engineered—cools, dehumidifies, circulates and filters and is adaptable for heating too. It's semi-portable, requiring only water and electrical connections, and makes economical, dependable cooling available for all types of business. Available in 3 and 5 ton sizes.

Thus the Curtis line becomes more complete than ever with the Store and Office Cooler, giving Curtis dealers an even wider opportunity for greater sales and profits. You can cover the field with Curtis equipment—Curtis experience and Curtis engineering assure user satisfaction.

CURTIS REFRIGERATION AIR CONDITIONING AND COMMERCIAL

Write to Curtis for details today.

Curtis Refrigerating Machine Co.

Division of Curtis Manufacturing Co.

1946 Kienlen Ave. St. Louis, Mo.

"Builders of Condensing Units Since 1922"

NO HEADACHES

—when you sell a job complete with Cook Furnace Switch

You'll get a lot of satisfaction in the confidence that the job is RIGHT when you sell it COMPLETE with a Cook Furnace Switch.

There'll be no after-regrets, no complaints, no headaches for you—or for the customer either.

Cook Furnace Switches assure more efficient, satisfactory furnace operation, are built to rigid standards of quality to give long-life, trouble-free service.

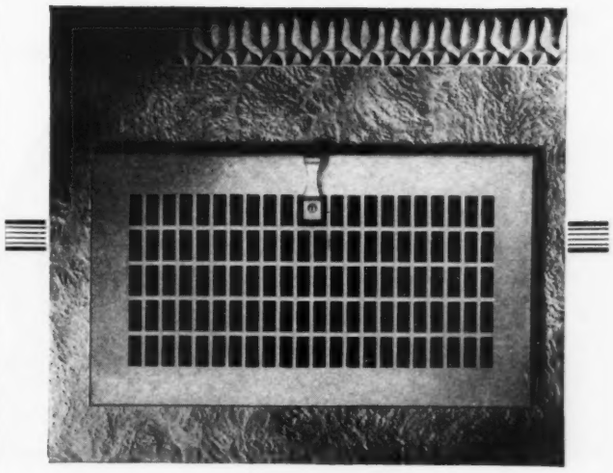
The new simplicity of installation and new efficiency of operation of Cook Warm Air Switches for Fan, Blower and Limit Control will interest you. Write today for information.

COOK CONTROLS

THERMOSTATS—FURNACE LIMIT CONTROLS
ZONE CONTROLS—BLOWER CONTROLS

COOK ELECTRIC CO.

2672 Southport Avenue Chicago



H&C No. 68 DESIGN GRILLES and REGISTERS

A Perfect Answer for Installations Requiring Utmost Economy!

When cost is of primary importance H & C No. 68 Design grilles and registers are the best bet you'll find anywhere; for, in spite of the fact that they are priced with the lowest, these grilles and registers present a very attractive appearance and are quality built in every detail. Here's one instance in which you do not have to sacrifice quality for price.

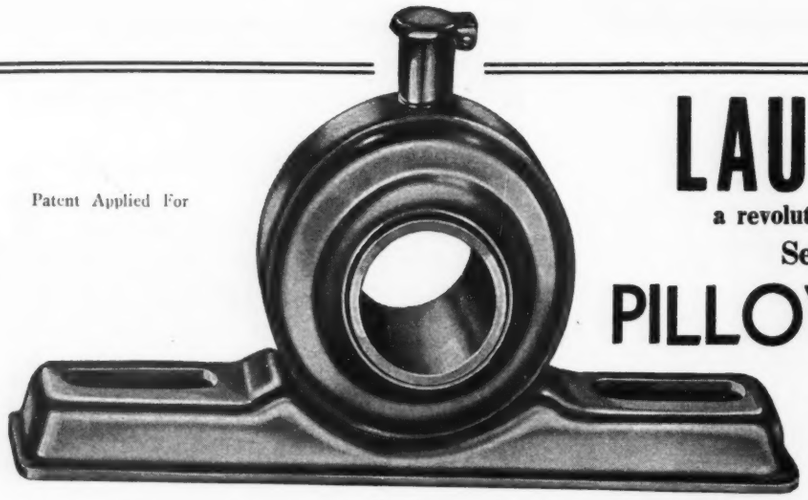
No. 68 Design provides ample free area and all items are interchangeable with corresponding items in the H & C line. For installations in which directional control of the air flow is not essential, the No. 68 Design with the various H & C frames will be found very satisfactory. When you require low-priced registers, by all means ask your Jobber to show you this H & C economy line.

HART & COOLEY MANUFACTURING CO.

Warm Air Registers Regulator Sets **H&C** Air Conditioning Grilles Dampers · Chain

61 W · KINZIE ST · CHICAGO · ILLINOIS

In Canada: Fort Erie N., Ontario



Patent Applied For

LAU *Presents*

a revolutionary, low priced,

Self-Aligning

PILLOW BLOCK

Completely Self-Aligning at All Times, Under All Conditions

The Lau self-aligning pillow block is completely *self-aligning at all times, under all conditions.*

The spherical surface of the bearing conforms to the contour of the housing, providing a universal joint action.

The die-formed steel housing holds twice as much oil as the ordinary cast iron type bearing reservoir. Oil is fed to the surface of the Durex bearing by capillary action. A constant oil film is maintained at all times, even when the shaft is not rotating.

Slotted bolt holes permit interchanging with other pillow blocks. Bearing projects beyond edge of housing, providing a self-lubricating bearing seat for the collar. A new idea in rubber mountings (optional).

WRITE NOW FOR COMPLETE DATA AND PRICES.

Manufacturers of blowers from 4½-in. to 25-in. diameter . . . almost any width.

The Lau Blower Company

Monument Avenue, East **DAYTON, OHIO**

CASH IN ON THOSE SICK FURNACES

Mr. Dealer, why don't you be the Doctor and fix the furnaces in your neighborhood whose humidifiers aren't working properly? These furnaces are really "sick", because the dry unhealthy heat they circulate throughout the home is the cause of many colds that doctors attribute to the lack of proper moisture in the home during the heating season.

A D. S. Skuttle automatic humidifier can be easily and quickly inserted in the bonnet or plenum chamber of the furnace without interrupting the heating—and its low cost will certainly help you to step up your sales and profits.

The D. S. humidifier comes completely equipped for installation, is available in 20" and 30" sizes or any size you specify. The pan is made of drawn steel and enameled inside and out, while the non-stick valves are made of copper and brass, assuring a long life of trouble free operation.

Let us help you doctor up those "sick" furnaces and your sales by writing us right now.

WRITE TODAY FOR **Skuttle** INFORMATION

J. L. SKUTTLE COMPANY — AUTOMATIC HUMIDIFIERS — 999 FRANKLIN ST., DETROIT, MICH.

With the Manufacturers . . .

Rowell Joins Air Controls

Ira W. Rowell, formerly of Furblo Company, has been appointed general factory representative of Air Controls, Inc., of Cleveland. He will work under the direction of B. G. Krause, general manager of sales, contacting, manufacturers and jobbers.

◆

Grand Rapids Furnace Cleaner Changes Name

The firm name of Grand Rapids Furnace Cleaner Co., 225 Stevens Street, S. W., Grand Rapids, Michigan, has been changed to Doyle Vacuum Cleaner Company.

The trade name—Grand Rapids furnace cleaner—will remain the same.

◆

Young Joins Evanoil

Appointment of Robert J. Young as service manager of the Evanoil division of Evans Products Company, Detroit, is announced by A. W. Shields, general sales manager.

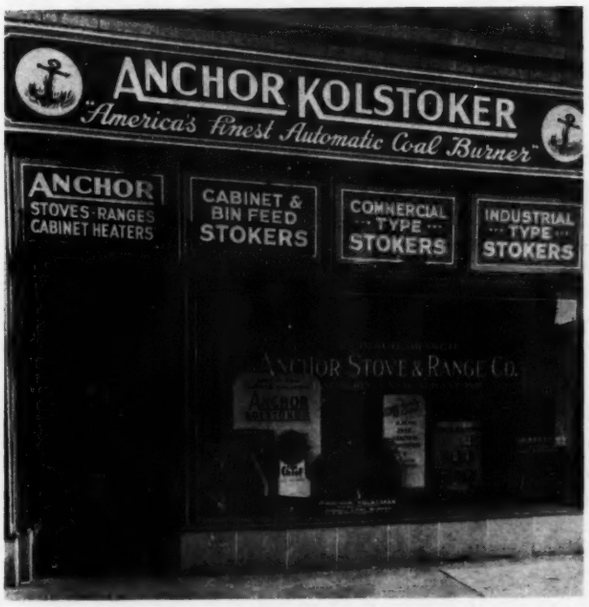
For the past four years Mr. Young has been associated with Automatic Products Company, Milwaukee, as sales engineer.

◆

Anchor Branch and Display

Anchor Stove & Range Co., New Albany, Indiana, has opened a Chicago show room and branch office at 59 West Wacker Drive.

Anchor's entire line of stokers and stoves is on exhibit,



including residential cabinet and bin-feed model stokers as well as commercial and industrial types in a full range of sizes. There are two new oil-fired cabinet heaters, a new stoker-fired cabinet space heater, three new cabinet heaters and a new streamline steel range.

◆

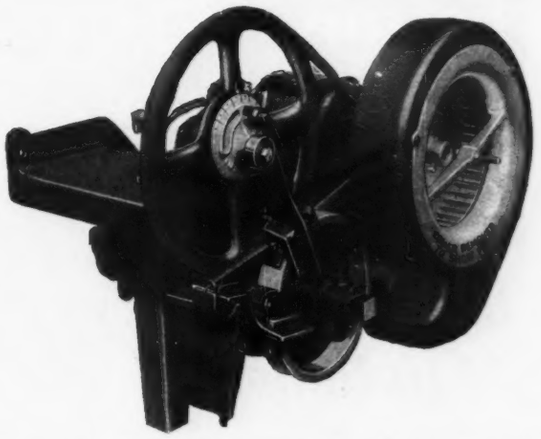
Tiffin Art Metal Plans Expansion

William G. Purdy, president and general manager of the Tiffin Art Metal Co., Tiffin, Ohio, announces a reorganization, increasing the capitalization with plans for expansion which will eventually include construction of additional plant space.

Mr. Purdy was reelected president and general manager of the reorganized company. John P. Speck was named vice-president and J. Hadsell Baum, secretary-treasurer.

The company manufacturers sheet metal products—metal roofing, siding, eaves trough, conductor pipe, skylights, ventilators, etc.

Here's WHY STOKER-OLA Is Outstanding in the Stoker Industry: NO GEARS!



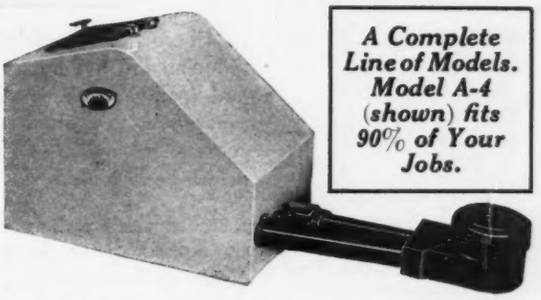
As great a step ahead as 4-wheel brakes or the high compression motor were to the automobile's development

With vastly less "machinery" to wear out or to neec servicing, and with unlimited coal-feed adjustments, it i slight wonder that STOKER-OLA dealers are having sucl a profitable year that "Merry Christmas" is more than jus a "wish" for them!

And a "Happy New Year" is a definite prospect—for they will sell more and more STOKER-OLAS to the friends of those who bought them and are enjoying them now!

And these "plus" features help to simplify the sale job:

- More Power
- Less Current Needed
- Only 2 Major Working Parts
- No Oil Leaks or Change
- Quality-Built to Last Longer
- 3-Year Guarantee



A Complete Line of Models. Model A-4 (shown) fits 90% of Your Jobs.

And Stoker-Ola Has "Looks" Too!

Worthy of ANY basement—but its PERFORMANCE wit the aid of such recognized components as Minneapoli Honeywell controls and repulsion-induction motor, is wha keeps it "looking good" to booster-owners—who even lik to tell their friends about STOKER-OLA'S PRICE!

It's Time NOW to Tune-in for 1939!

ADVANCE APPLIANCE CO., Inc

808 S. Washington Street **Peoria, Illino**

Gentlemen: Please send full details of your dealer proposition. (Sign below—or clip to your letterhead.)

.....

.....

A Sales Booster because it is a Performance Booster !

More Efficient Ventilation–

The new Swartwout Rotary is the scientific product of years of ventilation experience and research — the latest development in gravity ventilation. Its performance under all conditions is remarkably efficient.

Better Satisfied Customers–

Your future sales depend upon present satisfaction of your customers. The better satisfied—the more "sold" they are on your service. By recommending and installing the new Swartwout Rotary you MAKE friends — not lose them. Write for prices and literature.

The NEW Swartwout ROTARY BALL BEARING VENTILATOR

THE SWARTWOUT COMPANY
18615 Euclid Avenue, Cleveland, Ohio

WINTER AIR CONDITIONING

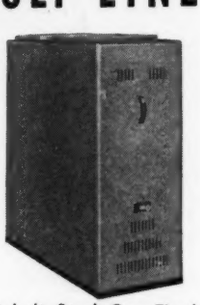
...CHOOSE THE RIGHT UNIT FROM THE RYBOLT LINE

Rybolt CBF Gas Fired Air Conditioning Unit.

. . . there's sound advice! Many an otherwise good winter air conditioning job has been ruined by the installation of a poorly qualified, inefficient air conditioning unit. Responsible heating men with reputations to protect realize they can leave nothing to chance, and consequently specify RYBOLT units to be certain of trouble-free, economical operation.

RYBOLT has a unit for any situation you might encounter in selling the homeowner on the installation. For coal-fired jobs . . . the Series 600A7 with steel heating element or the Series 157 with the cast-iron furnace will afford perfect heat for any home. For FULLY AUTOMATIC HEAT neither of the two gas-fired units can be excelled and once installed you need never go back except for an occasional adjustment.

You can make plenty of extra profits handling the RYBOLT line. Write us today for further information. Literature will be sent immediately.



Rybolt Steel Gas Fired Air Conditioning Unit.

Series 600A7 Winter Air Conditioning Unit.

Series 157 Winter Air Conditioning Unit.

THE RYBOLT HEATER COMPANY

ASHLAND OHIO

With the Manufacturers . .

Pyramid Metals Moves

Pyramid Metals Company, manufacturers of Snap-On and decorative mouldings, have moved to a new modern factory at 1335 N. Wells St., Chicago. Christopher F. Tonne is sales manager.

◆

Wheeling Corrugating's New Warehouse

Wheeling Corrugating Company has launched construction of a 130,000 square foot warehouse and office building at St. Louis.

The two-story office section will be characterized by distinctive modern lines, with four large show windows equipped with turntables for revolving displays. Glass block will be used extensively in the facade.

◆

Penn Branch Office Personnel

A. W. Barr, who has been associated with the automatic control industry for many years, has been named manager of the Boston office of Penn Electric Switch Company.

A. L. Rubel, who has been manager of Penn Electric Switch Company's Boston office, since it was opened in 1933, has been transferred to take charge of the company's Philadelphia branch, opened last spring.

D. A. Coon, who opened the company's Philadelphia branch last spring, was placed in charge of the new branch opened at St. Louis in September.

◆

Larger Quarters for Kisco

The growing demand for Kisco products has again made it necessary for the Kisco Company, Inc., to seek larger quarters—at 3732-40 Chouteau Avenue, St. Louis.

The two Kisling brothers, J. W. and Wm. L., who are the owners of the Kisco Company, Inc., date their experience in the ventilating, air recirculating, and air conditioning field back to the year 1924.

The new building measures 142x142 ft., with a lot measuring 50x142 ft., which will be available for further expansion.

◆

Derby, Jr., Joins Spencer

The Spencer Thermostat Company, Attleboro, Massachusetts, announces the opening of an office at 110 East 42nd Street, New York City, in charge of J. N. Derby, Jr.

Jack Derby is well known in the control industry, having been connected with The Mercoid Corporation for twelve years previous to joining the Spencer organization.

In addition to his activities in the New York area, Mr. Derby will have charge of Spencer Klixon stoker control sales. The company has developed a Stoker timer operating on the thermal principle and will push the sale of this along with its well-known Klixon room thermostat and limit controls.

◆

Research Products Purchases Plant

The Research Products Corporation, with offices and plant at Madison, Wisconsin, has recently purchased, from the C. F. Burgess Laboratories, Inc., the buildings and land at 1011-1015 East Washington Avenue, Madison, Wisconsin.

Officers are Howard F. Weiss, president; Kemper Slidell, vice-president; Max H. Kliefoth, treasurer; Milton J. Shoemaker, secretary;; and Bertha Weisman, assistant secretary and treasurer.

The viscous-coated throw-away type of air filter, formerly known as the Burgess air filter, is being manufactured and marketed by the Research Products Corporation under the name of Walton air filter.

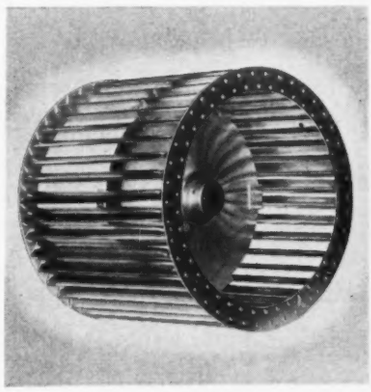
The future plans of the Research Products Corporation, as reported in an interview with Mr. Kliefoth, manager of the Air Filter Division, include an expansion of the air filter line to provide filter units for many new industries and applications. James Payton is sales engineer of the Air Filter Division.

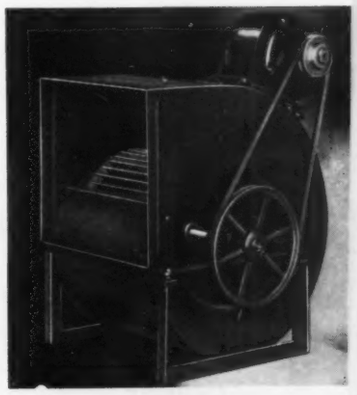
DYNAMICALLY BALANCED

For all air moving jobs

UTILITY BLOWERS

Most complete line . . . all sizes single and double inlet . . . full-floating . . . self-aligning bearings . . . rubber cushion mountings . . . completely die formed . . . baked enamel finish.





The UTILITY Furnace Blower

Installed by cutting top panel . . . no special duct fittings . . . "Dust-Stop" filters . . . variable speed pulley . . . uses minimum floor space.

Dealers' price
Model 110 DF
F.O.B. Los Angeles

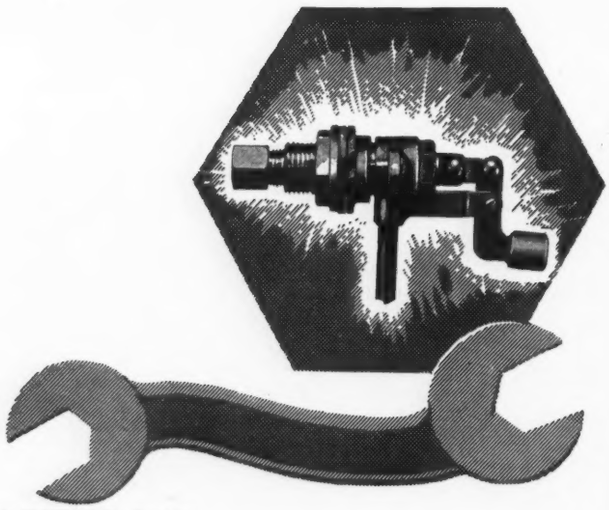
$39.50

Write Today For Complete Catalogs

UTILITY FAN CORPORATION AA
2528 Santa Fe Ave., Los Angeles, Calif.
Please send complete information on your

_____All Year Conditioner
_____Blowers _____Evaporative Coolers

Name_____
Street_____
City_____ State_____



LITTLE JOB

LARGE PROFIT

In thirty minutes you can reduce your customers' fuel bills, help their health, and make a sizeable profit for yourself.

It takes just that long to install the M-VB Humidifier valve to any type of warm air furnace. Keeps water at the *right* level for proper humidification . . . and tests prove that this makes people comfortable at 8° *lower* temperature.

Additional sales points: The plunger bearing is a tiny plastic ring that resists heat and water. It bars corrosive foreign matter from working parts by preventing water from splashing back when the valve is open.

You don't even have to drop the fire to install this. Ask your wholesaler. Or write direct to Morency-Van Buren, Sturgis, Michigan.

Saves You Time in Selling — Time in Installing

SCOVILL

MANUFACTURING COMPANY

MORENCY-VAN BUREN DIVISION

STURGIS, MICHIGAN

Complete line of water closet tank fittings and humidifier stocks also maintained at Waterville, Connecticut and San Francisco.

—News Briefs—

New Plants and Additions

The Schick Products Co. has purchased the building it occupies at 135-145 Tehama street, San Francisco, Cal., with its metal products business, and plans remodeling and installation of some new machinery.

◆

The California-Fresno Oil Company, Fresno, Cal., is building a new sheet metal shop to provide for the addition of an air-conditioning division. Stanley A. Wrightman is the sales engineer in charge of the new department.

◆

A new office and warehouse building will be erected at 870 South Broadway, Pasadena, Cal., by Copper Roofs Company of Southern California, whose office is now at 218 North Lake street, Pasadena. The new plant will cost $3,200.

◆

W. F Slater Engineering Corporation, S. Second St., Memphis, Tenn., has just taken a lease on the stone building at 664 Union Ave., and is now remodeling it for sales and parts office and warehouse stocks. The firm has developed as a Carrier products firm adding to its former field of large structures, smaller quarters, homes and single rooms, offices, etc.

◆

The Jeskey Sheet Metal Works, Frank Jeskey, manager, has begun erection of 22x90 ft. business building in Berlin, Wis.

◆

F. C. Crossman is the owner of $7,500 sheet metal shop being erected in the Huntington Park District, Los Angeles, Cal.

◆

The Wilson & Bennett Manufacturing Co., Chicago, is constructing steel container manufacturing plant on Washington avenue, Port Arthur, Tex.

◆

The Hall Sheet Metal Co., 1932 W. 20th St., Cleveland, Ohio, has added a one-story brick and steel building to its shop.

◆

Changes in Ownership

J. E. Kiesling has sold the Twin City Sheet Metal Works, Chehalis, Wash., to Fred J. Schuster. The plant is located at 1202 Main street.

◆

Wesley Habich has sold the Vancouver Sheet Metal Works, Vancouver, Wash., to Arnold Habich.

◆

V. E. Gallagher has sold his sheet metal works at 108 North Wenatchee, Wenatchee, Wash., to Glen Peffley.

◆

Mr. Colan has taken over the interest of Andrés Leoni in the Colan-Leoni Heating & Sheet Metal Co., 192-4 Russ street, San Francisco, Cal.

Obituary

Ernest Clark West, 56, of the West Brothers' Sheet Metal Company, Atlanta, Georgia, died October 22 at his home, 311 Tenth St., N. W.. Atlanta. Surviving are a wife, two sons and a daughter. Two brothers—J. Hoyt and Fred G.—are partners in the company.

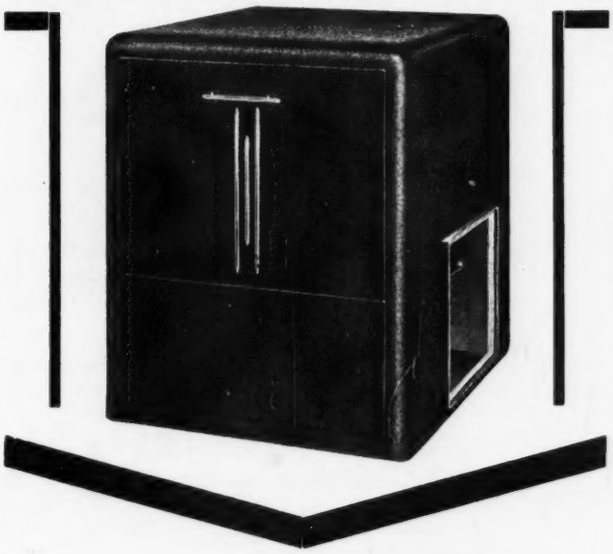
◆

John L. Ackroyd, Sr., a member of the roofing supply company of William F. Potts & Sons, Philadelphia, died October 5. Surviving are three sons—Edward, T. Henry and John L. Jr.—and two daughters.

◆

Horace J. Shotwell, 70, 1105 Washburn Ave., S., Minneapolis, president of the sheet metal concern bearing his name, died October 9. Surviving are his wife, mother, a daughter and four brothers.

HERE'S WINTER BUSINESS



SELL THIS MONCRIEF BLOWER-FILTER UNIT

- *Attaches to Any Warm Air Furnace.*
- *Circulates and Filters the Air.*
- *Can be Installed Without Interrupting Operation of Furnace.*

Find the people in your community with hard-to-heat rooms, and people who are troubled with dirt and soot nuisance. These are the ones who need and will want a Moncrief Blower-Filter Unit attached to their warm air furnace—and this is the time of year they best appreciate the need and value of this equipment. The cost is little, the effect marvelous, and the profit to you, important.

And while you are selling them a Blower-Filter Unit, don't forget to talk the importance of a Moncrief Automatic Humidifier. With a warm air furnace and these two pieces of fine equipment your customers can enjoy all the benefits of winter air conditioning—and you can enjoy the benefits of many extra dollars of profit.

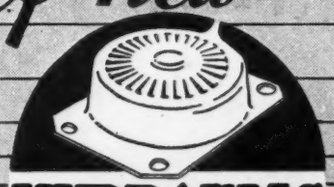
There are home owners all around you waiting for the good news. Moncrief has the right equipment at the right prices. Write for details and descriptive literature so you can start profiting right now.

THE HENRY FURNACE & FOUNDRY CO.
3473 E. 49th St. Cleveland, Ohio

Manufacturer of

MONCRIEF
FURNACES AND WINTER AIR CONDITIONERS

A New IDEA



HYDRAULIC ACTION CONTROL

FRIEZ BALTIMORE

For HEATING, AIR CONDITIONING, FURNACES, HOT WATER, REFRIGERATION, OVENS, FANS

What It Offers

The Friez Hydraulic Action Principle—using a "solid liquid charge" is essentially a sound one . . . for the liquid is gas free and possesses expansion characteristics of solid steel.

Hydraulic Action offers permanent accuracy and fine differential of control at a cost you can't afford to overlook.

Hydraulic Action provides sturdy construction to which simple installation and maintenance; plus sustained performance through a long life are logical results.

Hydraulic Action provides a heavy duty switch, high contact pressures and high load carrying capacity—**No relays required.**

We'd like to tell you more about these new and amazingly simple controls which offer superior performance, permanent accuracy and fine differential.

Just jot your name below and mail the coupon Today.

FRIEZ BALTIMORE

Send me details on the New Hydraulic Controls

Firm_____
Address_____
Attn._____
Position_____ 3

JULIEN P. FRIEZ & SONS, — BALTIMORE, MD.
Division of Bendix Aviation Corporation

It is significant that Tuttle & Bailey Flexair Registers were selected for all supply outlets in New York's first apartment building with complete INDIVIDUAL AIR CONDITIONING and HUMIDITY CONTROL, at 25 East 83rd Street.

Behind each supply outlet in this completely modern building is a metal plate specially designed by the consulting engineer. The Flexair register, scientifically designed to provide adjustable deflection of the air stream, fits pleasingly but unobtrusively into the lovely surroundings.

—News Briefs—

New Incorporations

W. E. Horne has engaged in the furnace and sheet metal business at 5221 Mission street, San Francisco, Cal.

◆

Ralph Beaver is opening a new sheet metal shop at 70 Oak Grove street, San Francisco, Cal.

◆

Ted Marks has engaged in the auto body and fender making and repairing business at 3116 N. E. Union Ave., Portland, Ore.

◆

The Hotel & Restaurant Equipment Co., C. Kreiger, manager, has engaged in the sheet metal business at 2204 Bryant street, San Francisco, Cal.

◆

Nelson & Co., Inc., has been chartered in Baltimore, Md., to engage in air conditioning business, by Arthur L. Nelson and Boyd Nelson.

◆

The Vanderbush Sheet Metal Co. has been incorporated to engage in sheet metal, tinning and air conditioning business with a capital of $10,000, and is located at 621 W. Larned street, Detroit, Mich.

◆

The Acme Heating, Sheet Metal & Roofing Co., Inc., 2378 Hampden avenue, St. Paul, Minn., has been incorporated with a capital of $25,000, by C. Parriott, M. B. Parriott and Steve Midler.

◆

The Economy Furnace & Sheet Metal Works has opened a furnace and sheet metal business at 446 Fulton street, San Francisco, Cal.

◆

The C. & F. Sheet Metal Works has engaged in business at 11633 Santa Monica Blvd., Burbank, Cal., by Theodore Clinton Couch, of 302 N. Frederick street.

◆

The Torrance Sheet Metal Shop has engaged in business at 1418 Marceline avenue, Torrance, Cal., under the management of Robert T. McCallum, of 723 Sartori st.

◆

The Hopps Sheet Metal Co. has engaged in business at 1749 Garfield avenue, South Pasadena, Cal., under ownership of Edward Leo Hopps, 1808 Eckhart St., San Gabriel, and M. M. Anderson, 812 Dos Robles, Alhambra, Cal.

◆

A certificate to conduct business under the firm name of Harbor Galvanizing Company, at 515 West "C" street, Wilmington, Los Angeles harbor, California, has been issued to the owners: E. A. Kettle and Lee R. Burton, of 1823 North Rose street, Compton, Cal.

◆

Edwin N. De Branch has obtained a certificate to conduct business under the firm name of Tri-State Fan and Blower Company, at 414 Base Line, San Bernardino, Cal.

◆

A certificate to conduct business under the firm name of O. K. Sheet Metal Works, at 727 East Twenty-first street, Bakersfield, Calif., has been issued to the owner, William Poteet.

◆

A certificate to conduct business under the firm name of Strand Sheet Metal Works, at 4623 San Fernando Road, Glendale, Cal., has been issued to the owner, Joseph B. Smith, of the same address.

◆

A certificate to conduct business under the firm name of General Heater Company, at 2204 West Washington boulevard, Los Angeles, Cal., has been issued to the proprietor, L. M. Maginnis, of 3687 Second avenue, that city.

◆

The manufacture of attic ventilation fans was recently begun by the Homemakers' Company, Pine Bluff, Ark., the first venture in this field in Arkansas. The Electrical Equipment & Foundry Company is making the aluminum castings, while the Standard Steel Products Company is supplying sheet metal parts and fixtures.

PLAN on INCREASED SALES and PROVEN PROFITS with *Pacific*...

☆ THE GAS HEATING APPLIANCE COMPANY BACKED BY THE EXPERIENCE AND REPUTATION OF A QUARTER CENTURY ☆

☆ Gas Heating Equipment Sales Will Reach New Heights and Pacific is Again in the Lead with New Models and the only Complete Line of Heating Units in the West.

☆ Make More Sales with Pacific's Sales-Compelling Features and Reputation for Performance . . .

☆ Make Bigger Profits with Pacific's Liberal Dealer Plan . . .

☆ Join Up with Pacific and Get Your Share of This Business . . .

Architects Specify . . .
Owners Demand . . . *Pacific*

☆ *DON'T DELAY WRITE TODAY!*

Pacific
GAS RADIATOR COMPANY
1740 W. WASHINGTON BLVD. · LOS ANGELES

Be sure ! ! !
Specify PILLOW BLOCKS by *Randall*

Randall Standard Pillow Block (single reservoir) with large special oil cup.

Be on the safe side in 1939 . . . specify Randall Pillow Blocks for your new units. Over 500,000 are in service. You can be sure of efficient and lifelong operation because behind each Randall pillow block stands a record of thirty-two years of achievement in the manufacture of fine bearings. This experience plus unsurpassed performance in the field has caused most manufacturers of heating and air conditioning equipment to standardize on Randall Pillow Blocks for their units and to continue to specify them on air conditioning blowers.

ONE-PIECE STEEL HOUSING PILLOW BLOCK

Randall One-Piece Steel Housing Pillow Block.

Two years ago foreseeing the need for a lower priced bearing which would be as efficient in operation as their other pillow blocks Randall began experiments to fulfill this need. After thorough testing Randall now introduces the One-Piece Steel Housing Pillow Block which is light in weight yet amply sturdy for any requirement.

Mounting can be made in any of four positions and full constant self-alignment is always assured. Consisting of only three parts, it is extremely simple to assemble and is interchangeable with all other Randall Pillow Blocks of like size. It is available in shaft sizes from ½" to 1".

Write for new 1939 catalog describing fully the complete Randall line.

EASTERN STOCKS

Tek Bearing Co.
177 Lafayette
New York City

American Stock Gear Co.
100 St. Clair Ave., N. W.
Cleveland, Ohio

PACIFIC COAST STOCKS

Utility Fan Corp.
Los Angeles, Cal.

C. W. Marwedel
San Francisco, Cal.

Randall GRAPHITE PRODUCTS CORP.
Dept. 1211 609 W. Lake St., Chicago, Ill.

"HAVE CLARAGE MAKE THEM"

Every year we ship to furnace manufacturers and to builders of unit air conditioners thousands upon thousands of Clarage Blower Wheels and Assemblies. These smaller units were designed with the same skill characteristic of the larger Clarage equipment — just as carefully constructed — just as carefully tested. And we have sizes to meet ALL REQUIREMENTS — with slow speed operation insuring SILENT PERFORMANCE. May we have your next inquiry?

SPECIFY CLARAGE for COMPLETE AIR CONDITIONING · VENTILATION · HEATING · COOLING · MECHANICAL DRAFT · FANS & BLOWERS FOR INDUSTRIAL NEEDS

CLARAGE FAN COMPANY • Kalamazoo, Mich.
SALES ENGINEERING OFFICES IN ALL PRINCIPAL CITIES

There is every indication that Lochinvar sales for 1938 will lead the field among all the manufacturers of automatic oil burning furnaces. The reason for Lochinvar's sales leadership is due to its policy of fair dealing with its dealers, by backing every sale they make with a product that has been proven to be of the highest quality construction, and that gives dependable and economical performance at all times. This certainly goes to build up good will, not only between the Lochinvar Corporation and the dealer, but between the dealer and his customers.

This confidence in the product plus the fact that each Lochinvar unit is priced low to sell the volume market, makes it a popular line with those dealers who are anxious to increase their sales each year. For details about the Lochinvar units write for literature today.

•

LOCHINVAR CORPORATION
14247 TIREMAN AVE. DEARBORN, MICH.

New Literature . . . .

For your convenience in obtaining copies of new Literature, use the coupon on page 92.

457—Class Equipment and Floor Plans

Niagara Machine & Tool Works, 637 Northland Ave., Buffalo, has prepared a bulletin giving suggested floor plans and corresponding machines and tools for sheet metal working classes in vocational training schools.

◆

458—Rustproof Roofing Nails

W. H. Maze Company, Peru, Illinois, is distributing two new pieces of literature—a 12-page catalog and price list covering Zinclad rustproof roof nails and a 4-page folder covering Maze Spirals, a new roll roofing nail which they say twists in when driven with a hammer and holds like screws. For reroofing a longer Spiral is offered.

◆

459—Building Necessities News

The Majestic Company, Huntington, Indiana, is distributing No. 2 of Vol. 1 of "Building Necessities News," dated September, 1938. The new fireplace, mailboxes, smoke dome, the new convertible oil and gas winter air conditioning unit, the "flame cutter," incinerator, and attic and kitchen ventilators are products covered.

◆

460—Heating, Ventilating, Air Conditioning

Melchior, Armstrong, Dessau Co. of Delaware, Inc., 300 Fourth Ave., New York City, is distributing Catalog No. 138, with dealer price list No. 3 dated September, 1938, containing 138 pages. There is an alphabetical index of products and a manufacturers' index of firms with the pages on which their products are catalogued, and finally a comparison chart for choice of control.

◆

461—Dealer Helps

Viking Air Conditioning Corp., Main & Center St., N. W., Cleveland, is distributing a new folder describing their new Viking Multi-Speed conditioner, and envelope stuffers covering their Economy package and the Viking automatic humidifier. These small folders are offered to dealers and distributors for consumer use, as part of the Viking campaign to help make the most of the winter air-conditioning business.

◆

462—Stock List and Data Book

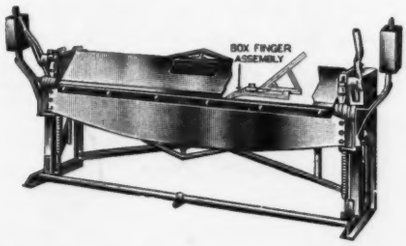
Joseph T. Ryerson & Son, Inc., 16th and Rockwell, Chicago, is distributing a new Condensed Stock List and Data Book—a handy pocket-size booklet containing an explanation of the change in steel classifications and extras, general data tables of interest to steel users, a condensed summary of products available for immediate shipment from Ryerson stocks, and a generously illustrated article on the story behind Ryerson steel-service.

◆

463—Collecting and Conveying Systems

B. F. Sturtevant Company, Hyde Park, Boston, is offering Catalog No. 291-1 entitled "Pneumatic Collecting and Conveying Systems," 64 pages and cover. There is a description of apparatus used in collecting and conveying material and the advantages of pneumatic systems are listed. Part II gives data covering the design and application of collecting systems with an example—how to find size of fan, size of main pipe at each point, pressure, volume, rpm and horsepower for any system, and sizes of connection pipes.

Bending Brakes **WHITNEY-JENSEN** Metal Tools



PRESS SEAMS EASIER!

ROLLER BEARINGS REDUCE EFFORT UP TO 90% ON ALL BRAKE OPERATIONS

• Frictions greatly reduced—stiffness eliminated—better, faster, easier work! Roller bearings replace plain bearings in the apron supports, the upper end of the toggles, and on the eccentric shafts. WHITNEY-JENSEN paves the way to lower costs and better workmanship, takes the hard work out of sheet metal bending, seam pressing, box and pan work, lock forming, etc., etc.

Write for full information.

WHITNEY METAL TOOL CO. • 97 Forbes Street, Rockford, Illinois

---

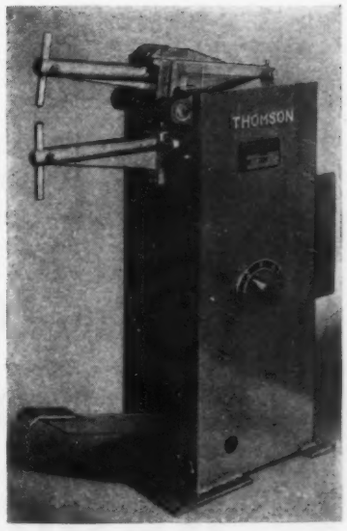
A Genuine

THOMSON SPOT WELDER

for only

$195.00

Handles Sheet Metal Work and General Medium Duty Welding



Here's a REAL all-purpose spot welder, capable of high-speed, low-cost production. Built with heavy steel frame enclosing all parts; husky, air-cooled transformer; heavy duty, double pole current control switch. 10,15 or 20 KVA capacity; 8, 12, 18-inch throat; adjustable stroke; pressures up to 200 lbs.; 5-point heat regulation. Fully described in bulletin 307. Write for a copy.

THOMSON-GIBB *Electric Welding Co.*

172 Pleasant St. Lynn, Massachusetts

Increase Your Profits! ON THOSE FURNACE REPAIR JOBS

Making a profit on furnace repair work usually means being able to work faster during the "rush" seasons. Much time and money can be saved by using a good cement. You'll find that Tharco Asbestos Furnace Cement will help boost your profits because it is

EASIER TO APPLY
ELIMINATES TROUBLE
LASTS LONGER

AN OUTSTANDING PRODUCT FOR OVER 25 YEARS

MANUFACTURED ONLY BY

THE ARMSTRONG COMPANY

DETROIT DALLAS CHICAGO

THOUSANDS OF FURNACE MEN FIND

Bigger Humidifier Profits

IN THESE THERMO-DRIP FEATURES

1 **Furnace Heat Control** gives perfect balance of indoor humidity and temperature. No mechanical parts—no hand-setting—no guesswork. It's strictly automatic.

2 **Stainless Steel construction** tells prospects it's built to last and serve. Affords more for the money. Builds good-will. Leads to other sales.

3 **Low Cost** lets you offer even the modest furnace-heated home the most important part of air conditioning—regulated moisture. Cheaper to buy than most humidifiers.

Write for Complete Details Today

AUTOMATIC HUMIDIFIER CO.

18th and Main Street CEDAR FALLS, IOWA

WATERLOO
Air Conditioning
REGISTERS

WRITE FOR DETAILS

Get acquainted with the fast-selling Waterloo line. Send for your Free copy of the new illustrated catalog, with charts, installation data, prices.

WATERLOO REGISTER CO.
Waterloo, Ia. Seattle, Wash.

METALBESTOS
(NON-CORROSIVE SAFE EFFICIENT)

GAS VENT & FLUE PIPE

FULLY COVERED BY PATENTS

APPROVED BY UNDERWRITERS' LABORATORIES, INC.,

PACIFIC COAST BUILDING OFFICIALS CONFERENCE AND OTHER AUTHORITIES

Thousands of installations have proven METALBESTOS to be without equal as a vent or flue for carrying off the products of combustion from gas fired appliances. It eliminates the dripping and sweating which occurs within other types of pipe.

METALBESTOS is scientifically constructed for venting gas fired appliances solely and is SAFE — DURABLE — EFFICIENT and EASY TO INSTALL.

WILLIAMS-WALLACE CO.
160 Hooper Street
San Francisco, Calif.

We are interested in your METALBESTOS GAS VENT and FLUE PIPE. Send along your catalog and price list!

NAME .....

STREET ADDRESS .....

CITY and STATE.....

New Literature . . . .

For your convenience in obtaining copies of new Literature, use the coupon on page 92.

464—Auer Register Book No. 39

The Auer Register Company, 3608 Payne Avenue, Cleveland, has just issued Register Book No. 39, illustrating and listing registers, intakes and grilles for gravity heating and air conditioning systems. There are 72 pages with cover, with a general index.

◆

465—Sheet Strip Stock List

Central Steel & Wire Company, 4545 S. Western Blvd., Chicago, is distributing Stock List No. 42, with specifications of sheet listed for immediate shipment. There are 24 pages, with a key to symbols in the sheet strip stock list. Facilities enable the company to slit to width and shear to size.

◆

466—Contour Sawing

Continental Machine Specialties, Inc., 1301 Washington Avenue South, Minneapolis, has available a new 150-page Handbook on Contour Sawing—an enlarged and revised edition—including material from the case record book, "25 Ways to Cut Machining Costs," as well as complete engineering data on Doall contour sawing technique.

◆

467—Band Filer

Continental Machine Specialties, Inc., 1301 Washington Avenue South, Minneapolis, has available a new 4-page folder about the Continental Band Filer—the machine which does internal and external filing in half the usual time. File bands ¼ and ⅜ in. wide can be used on materials ranging from high carbon steel to soft brass, wood, etc.

◆

468—Patented Gas Burners

The Barber Gas Burner Company, 3702 Superior Ave., Cleveland, offers their new Catalog No. 38-A, describing the entire line of Barber products—burners, pilot and shut-off valves, gas pressure regulators, and controls. A consumer folder—Form 9-38-A—entitled "Why Not Enjoy Perfect Heat?" with space for dealer imprint, is available to dealers.

◆

469—ABC of Winter Air Conditioning

Air Controls, Inc., Div. of The Cleveland Heater Co., 1933 West 114th St., Cleveland, is distributing a booklet entitled "The ABC of Winter Air Conditioning," prepared to assist retail salesmen by supplementing their verbal sales story with attractive, humorous illustrations and a logical exposition of the selling points for forced-filtered air. There is a small charge to cover handling costs of this presentation manual.

◆

470—Rival Strap Memorandum Book

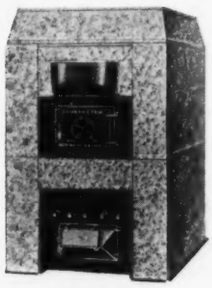
David Levow, 308 West 20th St., New York City—roofers' and tinners' supplies—is offering the trade a memorandum book, giving in addition to postal information, weights and measures, population, etc., special data of interest to sheet metal workers, such as properties of metals, expansion and contraction, wire gauges, number of copper nails to pound, etc.

◆

471—Sheets, Strip and Galvanized Roofing

Bethlehem Steel Company, Bethlehem, Pa., is distributing Catalog No. 145—108 pages—entitled Sheets, Strip and Galvanized Roofing. There is a list of the products produced, a description of the methods of rolling and other processes, definitions of sheets, tables of weights and thicknesses, bundling tables, formed products data and bundling tables, trade customs, manufacturers' standard practice, conversion tables, and a list of general offices.

QUALITY EQUIPMENT-- FROM HESS-- COSTS LESS



BENEFACTOR WELDED STEEL FURNACE
OUR PRICE LEADER

• • •

It's priced no higher than the ordinary cast-iron furnace, size for size, and gives far more value.

• • •

The Hess Line is complete for every dealer requirement, including steel furnaces up to one million B.T.U. capacity, Blower Filter Units, oil burners, coal stokers.

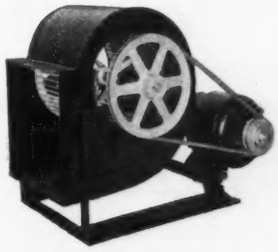
FREE PLAN SERVICE

F.H.A. terms give dealer full payment in installment sales. FREE Attractive consumer literature to help you make sales.

WRITE FOR DEALER PORTFOLIO
HESS WARMING & VENTILATING CO.
1211-27 S. WESTERN AVE. Founded 1873
CHICAGO, ILLINOIS

How About 1939?

Before deciding on your blower requirements for the new year—see



THE

Peerless LINE

DIRECT-DRIVE AND BELTED BLOWERS AND PACKAGE UNITS—BLOWER WHEELS AND PARTS.

We can now supply a top-mounted blower for manufacturers. Write to

FAN & BLOWER DIVISION
THE PEERLESS ELECTRIC CO.
WARREN, OHIO

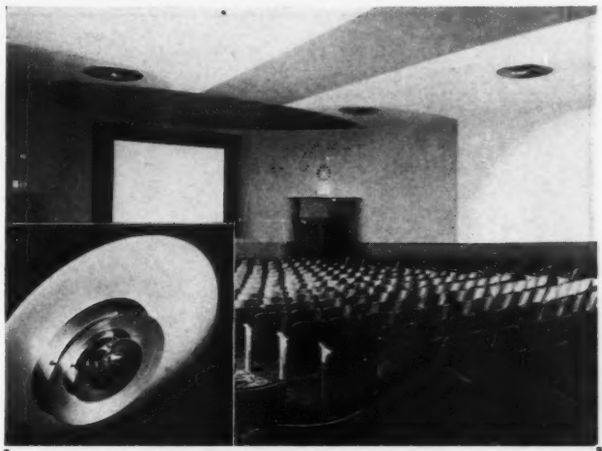
FAN BLADES

TYPES Attic—slow speed · Exhaust—direct drive · Exhaust—belt drive · Pedestal—direct drive

- Guaranteed certified ratings
- Die stamped and formed steel blades
- Perfect balance and alignment
- Greater volume of air per watts consumption
- All sizes 19″ to 60″

WM. J. LOHMAN, Inc.
62 Ninth Ave., New York, N. Y.

Write today for further information, a postcard is sufficient.



ANEMOSTAT

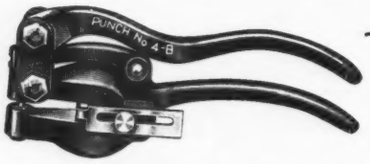
HIGH VELOCITY AIR DIFFUSERS

which have no moving parts are easily installed. We will be pleased to furnish upon your request drawings showing many methods of fastening the Anemostats to ducts and other installation data. AN-28-B

•

ANEMOSTAT CORPORATION OF AMERICA
10 East 39th Street New York, N. Y.

WHITNEY
LEVER PUNCHES



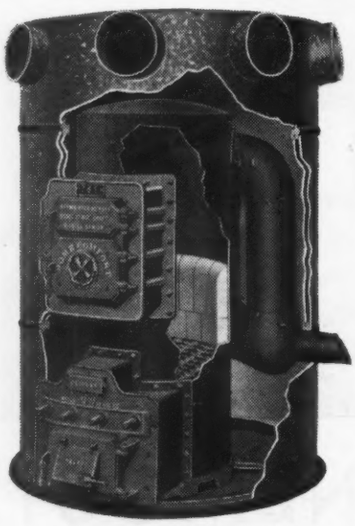
NUMBER FOUR "B" PUNCH

This punch for sheet metal work has a capacity of ¼" through 16 gauge. Weight 3 lb. Length 8½". Depth of throat 2". Complete tool includes three punches and three dies of specified sizes with die adjusting key. A time-saver for your up-to-date shop.

And here's another handy tool for the modern shop — the No. 2 Punch. Length 23". Capacity 5/16" through ¼" iron, weight 12 lbs., depth of throat 1 11/16". Punches and dies 3/32" to ½" by 1/64".

NUMBER TWO PUNCH

W. A. WHITNEY MFG. CO.
636 RACE ST. ROCKFORD, ILL



THE "Home Comfort"

A unit of the "GRAND PRIZE" line with a capital "G."

"HOME COMFORT" has been accepted as a standard for measuring quality in heating equipment for the past 54 years. This unit can be had with standard round casing, or the easy to erect rectangular cabinet.

For details wire or write

ST. LOUIS FURNACE MFG. CO.
2901-11 ELLIOT AVE. ST. LOUIS, MO.

New Literature . . . .

For your convenience in obtaining copies of new literature, use the coupon on this page.

472—Advance Relay Series

Advance Electric Company, 1260 West Second St., Los Angeles, California, is distributing an 8-page catalog and price-chart covering various relays. The company also designs and produces special equipment to specifications.

◆

473—Scully Stock List and Reference Book

Scully Steel Products Co., subsidiary of United States Steel Corporation, 1319 Wabansia Avenue, Chicago, has just issued a new stock list and reference book in an easy-to-find indexed form valuable to buyers of steel. In addition to the long list of Scully products—sheets, bars, angles, wires, stainless, eaves trough, copper and brass—the book also includes handy reference tables with standard gauges, length of rivets necessary for various grips, weights of steel circles, circumferences and areas, U. S. gallons in round and rectangular tanks and other helpful information.

◆

474—Calendars

David Levow, 308 W. 20th St., New York City, is distributing 1939 calendars with valuable reference tables about 15 x 17 in., giving information on wire gauges, diameters, circumference and areas of circles from 1 in. to 12 ft.; contents in gallons of tanks; weights of sheet zinc and copper; expansion and contraction of metals; number of copper nails to pound; physical properties of metals; size of drills and taps; weights and measure; and rules of calculations.

Requests must be sent on business stationery.

◆

475—Mineral Wool and Vapor Barrier

National Mineral Wool Association, 1270 Sixth Avenue, New York City, is distributing Research Bulletin No. 28 issued by the Producers' Council of the American Institute of Architects, specifically covering approved construction details for the hand installation of mineral wool.

Mineral wool in batt and blanket forms is now made with a vapor barrier as an integral part of the product. When loose mineral wool is to be hand packed, it is essential in cold climates to cover the warm side of the insulated areas with a vapor resistant material, approved by the manufacturer of the insulation.

Another Nu-data bulletin will embrace the installation of mineral wool by the pneumatic process.

FOR YOUR CONVENIENCE

American Artisan, 6 N. Michigan Ave., Chicago, Ill.

Please ask the manufacturer to send me more information about the equipment mentioned under the following reference numbers in "New Products" and "New Literature."

(Circle numbers in which you are interested):

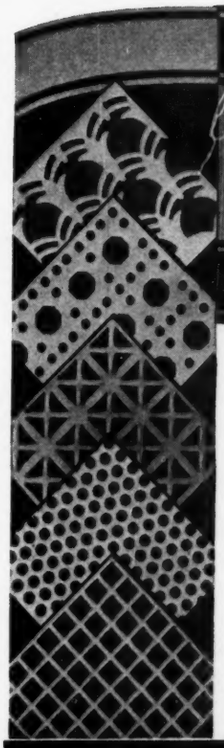
331	332	333	334	335	336	337
338	339	340	341	342	343	344
345	346	347	348	349	350	351
352						
457	458	459	460	461	462	463
464	465	466	467	468	469	470
471	472	473	474	475		

Name ..... Title .....

Company .....

Address .....

Are you Manufacturer——Jobber——Dealer——



INDUSTRIAL
PERFORATED METALS
ORNAMENTAL

The H. & K. line offers a wide selection of ornamental and decorative grilles for public and private buildings suitable for radiator enclosures, ventilators and air conditioners. Write for Booklet No. 30.--Industrial screens for grading and separating many products -- for safety guarding and other uses. Unusual specifications carefully executed.

ANY METAL
ANY PERFORATION

The Harrington & King PERFORATING CO.

5649 Filmore St., Chicago, Ill. New York Office, 114 Liberty St.

U.S. AIRCO

BLOWER-FILTER PACKAGE UNIT

Compact, neat, dependable, quiet. G. E. guaranteed motor, Baked Enamel Cabinet, Randall Bearings, and other quality features.

10½" Blower size (1000-1200 CFM) complete with Minneapolis-Honeywell Furnacestat, ready to install. DEALER'S price, F. O. B. Factory ... $45.50
or, Less the Furnacestat.. 40.50
4 other sizes — up to 5500 CFM.

Blower Assembly

For any warm air unit. Quiet, efficient, vibrationless. 10½" size—1000 to 1200 CFM (less drive and motor). DEALER'S price F.O.B. Factory
$18.00
Other sizes from 800 CFM up. Also separate wheels and scroll housings.

Immediate Shipment

REDUCED PRICES

offer real opportunity for *Dealers, Jobbers* and *Manufacturers.*

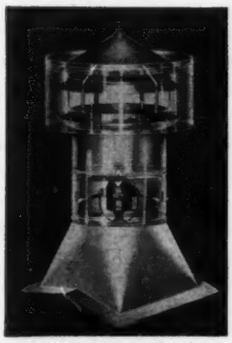
Liberal discounts to Jobbers and Manufacturers on complete line of Blower-Filter Units and Assemblies. Before your 1939 commitments are made, get complete details on U. S. AIRCO equipment.

U. S. AIR CONDITIONING CORPORATION
2105 Kennedy St. N. E., Minneapolis, Minn.

6000 INSTALLATIONS PROVE U.S.AIRCO DEPENDABILITY

There's Money For You... Selling

BURT Ventilators



STANDARD FAN TYPE

The whole world has become air conditioning minded, and one of your biggest opportunities is in more and better roof ventilation. All around you are factories, schools, public buildings, halls, stables, residences, etc., that need new and better ventilators. Burt makes a type and a size for every purpose, favorably priced to interest the builder or building owner, and paying you a good profit. Burt Engineers make it easy for you by helping you estimate and lay out plans. Send for catalog and particulars of the Burt proposition.

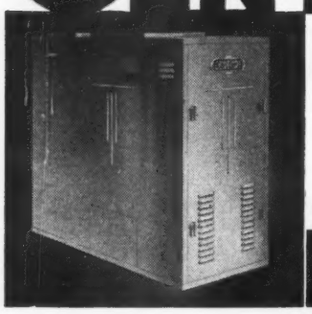
THE BURT MFG. CO.
301 MAIN STREET · AKRON, OHIO

Stoker Dealers..
YOU CAN FIRE SCOTCH MARINE TYPE BOILERS SUCCESSFULLY WITH
KōL-MASTER

LARGEST, MOST COMPLETE LINE of SINGLE RETORT, UNDERFEED, SCREWFEED STOKERS in the WORLD

Kol-Master is installed right in the fire tube. Maintains proper combustion conditions; secures uniformly even coal distribution full length of fire box. Get details. We will gladly cooperate with stoker dealers who are not directly in competition with Kol-Master dealers.

KōL-MASTER CORPORATION
OREGON, ILLINOIS

CENTURY

ZEPH-O-LATOR
85%
OVERALL EFFICIENCY
CENTURY ENGINEERING CORP.
CEDAR RAPIDS IOWA

How to Sell Furnaces and Repairs

WITH
The TORNADO Furnace Cleaner
The TORNADO gets you into the basement where it is easy to sell repairs and new furnaces. And you make a profit on the cleaning job too!
Dealers say that the TORNADO is the most powerful furnace cleaner built. Leads the field! Low price—easy payments—free trial. Approved by Anthracite Institute and Underwriters Lab. Thousands in use.
Write now for complete information.
Breuer Electric Mfg. Co.
5082 Ravenswood Avenue, Chicago, Ill.

NU-DRY
FURNACE CEMENT
A DIFFERENT CEMENT
Nu-Dry makes a gasket in the joints which will not crack or powder by the expansion and contraction of the castings when they are heated and cooled. It comes to you in dry form . . . takes less material to set a furnace. DOES NOT CRACK, BLOAT OR POWDER LIKE ORDINARY CEMENT WHEN FURNACE IS FIRED IMMEDIATELY AFTER APPLIED. . . . Will not shrink . . . keeps joints tight at all times . . . withstands high temperatures . . . and eliminates material losses for it does not harden in containers.
Send for free sample
PYROLITE PRODUCTS CO.
1221-31 West 74th St. Cleveland, Ohio

ACME "Hot Spot" WELDERS

Universally accepted as the sturdiest, easiest handled, most economical electric Spot Welder on the market.
Write for literature and prices
Don't Rivet
SPOTWELD!
with an ACME
Lifetime Guarantee!
Complete range of sizes
ACME ELECTRIC WELDER CO.
Distributors in principal cities
5619 Pacific Blvd. Huntington Park, Calif. (Los Angeles County)

Heat Conservation

(*Continued from page* 49)

case. In general, the insulation of boilers and piping and risers on steam, vapor and hot water systems should be carried as far as possible without making the basement too cold. It is usually inadvisable to allow a basement temperature much more than 10° below first floor temperature, and in parts used as laundries or club rooms, it must be warmer.

In the case of warm air ducts the saving that can be obtained by insulation is usually not so great as from piping on account of the bright metal of which the ducts are built. Since these ducts are close to the ceiling, heat loss from them is usually fairly effective in maintaining a warm first floor.

There are a number of heat losses from a building that are avoidable by care and foresight on the part of the occupants. Carelessness with regard to doors and windows may account for considerable avoidable cost. Closing off rooms and cutting off radiators or registers in rooms that are not in use should be practiced. The weatherstripping of bedroom doors to keep the cold air in the bedrooms, when windows are open, out of the rest of the house may often be advisable if the doors do not fit tightly.

Conclusion

The whole object of this report has been to present in a simple, even elementary way, some of the more important facts that have a direct bearing on the conservation of heat in gas heated buildings. We have endeavored to indicate what measures should be advocated and how far they can be carried with profit. There is, for every conservation measure, a point beyond which the additional expenditure fails to yield a worthwhile return. In weatherstripping we are limited by the need of a certain amount of air change to prevent sweating of windows and to preserve a healthful condition in the air in the house. In insulation we have seen that beyond a certain and easily ascertained point, the return would not pay a satisfactory interest on the investment.

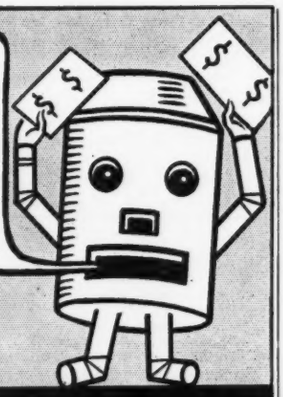
The heating engineer should not only recommend and specify the use of insulation and other heat conserving measures; he must definitely specify how and to what extent they are to be applied. It is only when this is done and done well that he is really serving those who depend upon him for advice.

Editor's Note

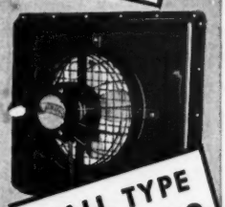
After the first installment of this article appeared in the November issue the following letter was received from C. George Segeler, Engineer of Utilization, American Gas Association—

"Since the Interim Bulletin No. 26 which you published appeared, additional studies have been made in this subject. From the preliminary studies which have been made, it appears that a very drastic revision of the treatment is going to be made and, in fact, it is quite probable that some of the conclusions which the original pointed to will be changed and perhaps com-

Easy Profits
Making
COLD ROOMS
Warm and Cozy!



FLOOR TYPE
LIST PRICE $7.50



WALL TYPE
LIST PRICE $10.00

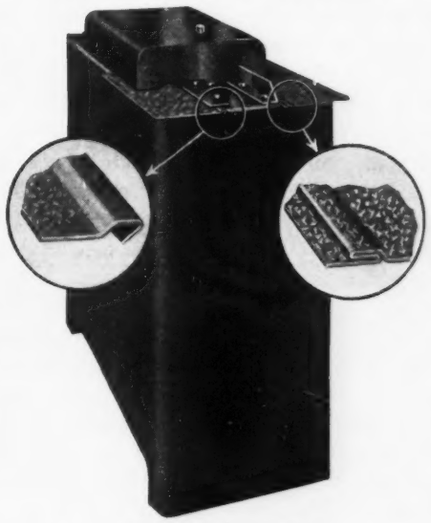
VICTOR
HEAT BOOSTERS

IT takes less than three minutes to cure any cold room with a Victor Heat Booster. The powerful fan first pulls out the cold air "cork" and then brings up the heat in a hurry. Overcomes sluggishness of long horizontal runs or undersized ducts. Counteracts abnormal drafts or lack of proper insulation or weatherstripping. Help yourself to extra profits by pushing Victor Heat Boosters—a demonstration will sell four out of five home owners. Write for complete details today!

VICTOR ELECTRIC PRODUCTS, INC.
840 Reading Road Cincinnati, Ohio

ALMAR MASTER
LOCK FORMING MACHINE

SIMPLE OPERATION WITH ONE MAN



EFFICIENT AND NEAT OPEN LOCKS

★ **ALMAR** ★

CAPACITIES: 16 ga., 18 ga., 20 ga., 22 ga.,
light enough to be taken ON THE JOB.

ALMARIZE YOUR SHOP FOR GREATER PROFITS
(Write for details)

WARD MACHINERY CO.
CHICAGO, ILL. 564 W. Washington Boulevard

Get Your Copy of This New Designing Manual Now!

SECOND EDITION
PLATTE OVERTON'S
"FORCED AIR HEATING"
215 Pages—6" x 9"—Illustrated—$2.00

Here is a book that will save you hours of time in the planning of your forced air heating jobs, as well as help you to avoid errors in your calculations. Outlined in it is a model procedure of design, based on wide experience, which you may follow with absolute confidence on any of your own jobs.

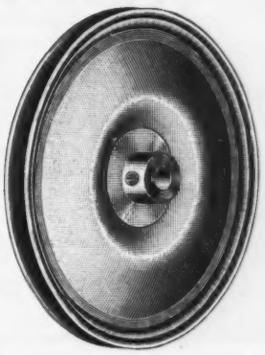
"Forced Air Heating" embodies all of the really worthwhile new data on forced air heating that has been developed through research and experience over the past several years. It illustrates by clear and concise examples the proper application of this new knowledge in actual designing work. Fifteen helpful charts, 23 time-saving formulas, and 19 practical tables are included with detailed explanations of their proper use.

Every contractor now doing or planning to get into forced air work should own a copy of this book. Send $2.00 today to the address below for your copy. You may order with the privilege of returning the book within 10 days for a refund if it should for any reason prove unsatisfactory.

KEENEY PUBLISHING COMPANY
6 N. Michigan Ave. - Chicago, Ill.

BALANCED — TRUE RUNNING
— QUIET AT ALL SPEEDS

MAUREY
ALL-STEEL V-PULLEYS

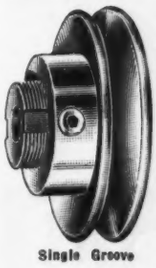


. . . will solve your Pulley problems if you need Pulleys for Blowers, Stokers, Fans and Air Conditioning Units where long time DEPENDABILITY is of utmost importance.

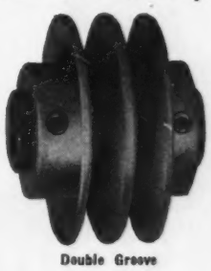
Made of STEEL with heavy roll finished edges, and hubs machined from SOLID STEEL or malleable iron. No Die Cast Hubs used in MAUREY PULLEYS.

Carried in stock in a wide variety of sizes for "A" and "B" belts.

MAUREY Variable Pitch Diameter Pulleys


Single Groove

Solid steel construction. Adjustment permits speed variation of as much as 30%. Fine, accurate, milled threads, 20 to the inch, assure close adjustment. Designed for Air Conditioning Units. Solid steel — not die cast. Made in 4 sizes, 3¼" to 4½ inches in diameter.


Double Groove

MAUREY MANUFACTURING CORP.
Wabash at 29th Chicago, Ill.

pletely revised. At the moment, there is nothing that need be done about it, but I thought you might be interested in seeing the new material when it is issued.

"We have changed our opinion on the value of rock-wool insulation in walls, and in our book Comfort Heating, we use a wall conductivity of .10 Btu per sq. ft. per degree for frame walls in place of .07 which was the basis of Interim Bulletin No. 26. This change alone greatly alters the economics.

"We have attempted to consider each form of insulation in relation to the competitive forms. We find, for example, that if a given insulation can be installed, say, for forty dollars per thousand square feet and another form of superior insulation may cost fifty dollars per thousand feet that it, nevertheless, might be better to use the cheaper form. We now feel that there are no conclusions which can be stated with regard to insulating materials. Each one will have to be studied in light of local factors which include number of degree days, price of gas, the installed cost of the insulation, and the savings in heating plant which can be effected by insulating ability.

"We have discovered that one kind of insulation is best in one city and another kind may be best in a different place. This analysis has made us question the treatment given in Bulletin No. 26 in which it appears as though you could almost increase insulation indefinitely and still earn a handsome return on the investment. However, if you consider the incremental value of insulation instead of the overall return, this false impression will not be created. For example, in Table C, the incremental return would appear as follows—

Amount of Insulation	Net Cost* Insulation Dollars	Incremental Net Cost Over Next Smaller Thickness†	Operating Cost	Operating Saving Over Next Smaller Thickness	Per Cent Return on Incremental Net Cost
None	....	....	$43.00	....	....
1"	$ 19.00	$19.00	21.50	21.50	113.00
2"	41.00	22.00	14.30	7.20	32.7
3"	72.00	31.00	10.70	3.60	11.6
4"	106.00	34.00	8.60	2.10	6.2
6"	$179.00	73.00	6.10	2.50	3.4

*Consequently interpreting choice of insulation for new buildings.
†Something is wrong with our data here as each additional inch of insulation cost more than the preceding.

◆

Oil vs. Coal Costs

(*Continued from page* 54)

gallons of oil would be required to equal the heating value of a ton of Anthracite.

It is, of course, recognized that many old and poorly operated plants are operating inefficiently, solely because coal will burn and give a measure of satisfaction even under most adverse conditions. Efficiencies are, of course, low in such cases and fuel comparisons change in proportion. It is also equally true that many oil-fired plants are operated with such efficiency-robbing features as high stack temperatures, and incomplete combustion, thereby pointing to many cases in which it requires 240 gallons of oil or more to equal a ton of Anthracite.

EASILY WORKED
This remarkable corrosion-resisting sheet metal has an amazing tensile strength because of its extremely close grain and uniformity of texture. Does not flake or peel when being quickly formed into intricate shapes. Ask for details!
LYON, CONKLIN & CO., Inc.
Baltimore, Maryland
Lyonore Metal
CHROMIUM — NICKEL — COPPER — IRON ALLOY

END COLD FLOORS

Superfex has the answer: Continuous air flow supplied under synchronized high-low control of both burner and blower. It solves the cold floors problem—provides continuous 24-hour warm air conditioning. ***Write for FREE booklet.***

PERFECTION STOVE COMPANY
7900-L Platt Ave., Cleveland, Ohio

SUPERFEX

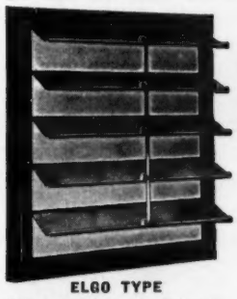
Oil Burning Air Conditioning Furnaces

A PRODUCT OF PERFECTION STOVE COMPANY

JOHNSON NO. 101 BENCH FURNACE
Gives You Efficient Performance at Low Cost

This versatile, strongly-built furnace gets maximum heat from all kinds of gas, including propane and butane! Two Johnson Direct Jet Bunsen Burners, each with shut-off valve and pilot, develop intense heat without the need of expensive blowers or forced air blast. The refractory-lined firebox is ideal for heat-treating carbon steel tools and parts, and handles soldering coppers up to 12 lbs. per pair. Many exclusive features insure finest work. Write for free catalog today.

JOHNSON GAS APPLIANCE CO.
Cedar Rapids IOWA



ELGO TYPE

Get our prices on Automatic Shutters, Stationary Shutters, Hand Operated Shutters, Ceiling Dampers, Balanced and Back Draft Dampers.

Elgo Ventilating Specialties

A Shutter That Fits More Snugly!

Here's an automatic shutter with a feature that has long been desired. When you see it, you'll say it's the snuggest fitting shutter you ever saw. And it not only closes more tightly but also opens more easily. No blade flutter—and no joints that get loose or rattle. Sizes from 10" to 60" square—also rectangular.

Write for circular and prices.

ELGO SHUTTER & MANUFACTURING CO.
634 W. Warren Detroit, Mich.

Free CATALOG

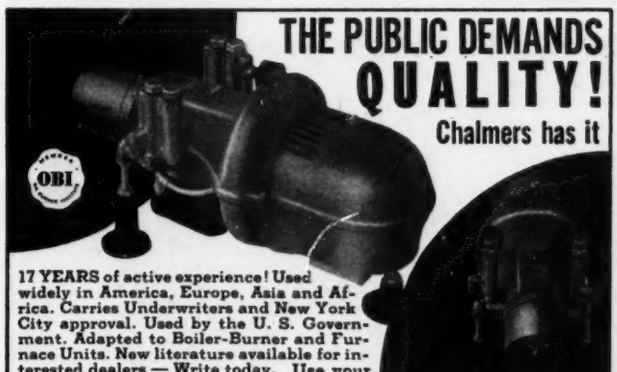
INCREASE PROFITS *with*
THE GRAND RAPIDS FURNACE CLEANER

Powerful—One-Man Portable Sturdy

The first Grand Rapids Furnace Cleaners put out years ago are still in use. Dealers say they are the best with no wear out to them.

Free Trial—Convenient Terms Write for Details

GRAND RAPIDS FURNACE CLEANER CO. 225 STEVENS ST., S. W. GRAND RAPIDS, MICHIGAN



THE PUBLIC DEMANDS QUALITY!
Chalmers has it

17 YEARS of active experience! Used widely in America, Europe, Asia and Africa. Carries Underwriters and New York City approval. Used by the U. S. Government. Adapted to Boiler-Burner and Furnace Units. New literature available for interested dealers — Write today. Use your letterhead, it stimulates us!

CHALMERS OIL BURNER CO. 1251 Central Avenue MINNEAPOLIS, MINN.

PORTABLE SHEARS
ALL-ALLOY

ALL-ALLOY No. 2 cuts up to ¼" steel plate.
ALL-ALLOY No. 1 cuts up to No. 11 gauge strip or sheet.
Special blades may be had for shearing stainless steel.

FULLY GUARANTEED

BREMIL MFG. CO. Erie, Pa.

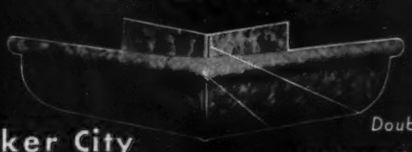
How To Install And Service Oil Burners

Oil Burner dealers are being given an opportunity to get a *single copy free* of a new book that should prove of great assistance to Oil Burner Dealers and Service men—"Installing and Servicing of High Pressure Domestic Oil Burners." The book gives step by step directions on how to install, service, and maintain; valuable hints, avoidance of trouble, etc. Additional copies, each $2.00.

$2.00 prepaid

P. O. BOX 794
PEORIA, ILLINOIS

"BB" QUALITY



Double Seam
Reinforced Corner

Quaker City Mitre

WRITE FOR "BB" CATALOGUE
Order from your jobber

Mitres, conductor pipe, hangers, eaves trough, caps, outlets, pipe hooks and fasteners

BERGER BROTHERS CO.
229-237 ARCH STREET, PHILADELPHIA, PA.

Installment Problems

(*Continued from page* 34)

payment, carrying charges, and length of contract. Not only does attention need to be given to the standardization of these items themselves but to the methods by which they are explained or advertised to the public.

Present concern is not with installment selling itself, but with the practices which have grown up in its extension during the recent years of rising prices and income. An installment sale today, however, unlike selling either for cash or on open credit, not only involves the pay check received by the buyer the last of this week or the first of next month, but the check which he may or may not receive 24 or 36 months hence. In other words, the state of the nation's business two or three years from now may determine whether there is any profit in the sale made today.

Installment contracts entered into during and immediately prior to 1929 contributed to the late depression. Instead of learning our lesson, however, certain abuses inherent in this type of selling have been expanded under competitive pressure. Unless proper control can be promptly gained and maintained over these factors the situation is apt to become more serious than it was in 1929. One phase of the attack upon the problem is the securing of current facts that are both significant and useable. The absence of facts, however, is no excuse for not taking immediate action in reviewing installment policies, and, where needed, changing from a policy of broad expansion to a more conservative one, a shifting made necessary today as we approach the peak of another cycle of business activity.

Recognizing the importance of installment credit, and the almost complete lack of current factual information, Doctor Dye, Director of the Bureau of Foreign and Domestic Commerce, is this month setting up an installment credit unit in the Market Research Division.

The members of the Department of Commerce have no theories which they wish to prove, no facts which they must find, no conclusions which they expect to justify. We hope to determine the total amount of transactions made on an installment basis, the proportion paid down, and the outstandings both for the United States as a whole and by industries, the type of goods sold on this basis, terms of sale, prevailing rates, geographical differences in the use of installment credit and agencies or institutions involved in the extension and collection of installment accounts. More important, in the long run, the Bureau of Foreign and Domestic Commerce will proceed with this work with the expectation of eventually setting up a current index which will indicate the position of installment credit from month to month or from quarter to quarter.

A Heat Hustler Fan Forces Air Through a Single Warm Air Pipe

Heat garages, sun porches and other rooms that will not heat by gravity. Mounts directly in the warm air pipe. Draws heat from the furnace and forces it into the hard-to-heat room. Quick heat for a bathroom.

Four reasons why you should use the American Heat Hustler:

1. It uses a positive pressure, rotary type fan.
2. Motor is outside the warm air flow, adding greatly to life of motor and leaving as much space for gravity air flow as before the Heat Hustler was installed.
3. It is quiet.
4. Furnished for either automatic or manual control.

Price list, with descriptive literature showing different models, sizes, etc., will be sent you by return mail upon receipt of your request. CLIP AND SEND THIS AD IN NOW!

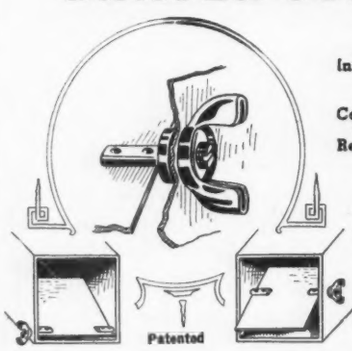
Patented

Manufactured by

CLIMATEMAKER CORPORATION of Tennessee

1804 W. END AVE., NASHVILLE, TENNESSEE

THE **GOESE** TIME SAVER **DAMPER CONTROL**



Patented

Positive—Simplified

Less Labor to Install Insures Tight Vibration-less Job

Can be Used on either Flat, Square or Round Pipes Regular or Splitter Dampers

Screw Slot on Threaded Stud Shows Position of Damper. Bearings—Rust Proof Metal. Wing Nuts—Cadmium finished. Ask your Jobber.

Goese Mfg. Co.

2548 N. 18th Street Milwaukee, Wis.

REPAIR PARTS?

. . . to fit every make and description of heating or cooking unit may be secured immediately upon order . . . and you can bet that if it's the finest quality at a low price you are seeking. . . .

CAPITOL HAS IT!

CAPITOL FURNACE AND STOVE REPAIR CO.

229 So. Meridian, Indianapolis, Ind.

G H Q

GRILLE HEAD-QUARTERS

Another year of progress has passed.
Another year for progress is at hand.
Have you watched our new developments? There are more soon to be announced.
We appreciate the business received from forty-eight states of the Union.

REGISTER AND GRILLE MFG. COMPANY, INC
70 Berry Street **Brooklyn, N. Y.**

JAMES H. BAILEY, President
TROWBRIDGE WARNER, Sales Manager
RUSSELL T. BAILEY, Director
BRUCE R. TUTTLE, Gen'l Counsel
CLIFFORD D. BAILEY, Secretary
EDWARD F. BLOM, Director
FRANK T. BAILEY, Vice President
ALFRED L. TUTTLE, Treasurer
ERIC D. MOLLANDER, Director

UNIFORM HIGH QUALITY
. . . at No Extra Cost

Ryerson certifies to the known uniform high quality of all steels in stock. Tighter, more accurate specifications—rigid inspection and checking—and years of preparation have built up stocks of these better steels. More than 25 kinds of sheets and all other steel products for the sheet metal worker are included. Special quality features and greater uniformity assure easy workability. When you need steel, order from the nearest Ryerson plant. Immediate Shipment is assured. Joseph T. Ryerson & Son, Inc. Plants at: Chicago, Milwaukee, St. Louis, Cincinnati, Detroit, Philadelphia, Cleveland, Buffalo, Boston, Jersey City.

RYERSON *Certified* STEELS

WISS
SCROLL-PIVOTER SNIP

Cuts circles, scrolls and squares as easily as a straight line. Will cut alloy metals.

Now furnished with serrated blade unless otherwise ordered.

Use Wiss Hy-power and Bulldog Snips

J. WISS & SONS CO.
Established 1848 Newark, N. J.

PUT ALL YOUR EGGS IN ONE BASKET
. . . PEERLESS GIVES YOU A COMPLETE LINE TO SELL

The advantages of selling a complete line under one familiar name are obvious. One installation sells another. Combination shipments reduce carrying charges. PEERLESS streamline cabinet type units, for coal, coke, oil or gas are models of modern style, beauty and efficiency. Prices are low. Generous discounts to the trade. Ask for literature and profit-making proposition.

PEERLESS FOUNDRY CO., 1853 Ludlow Ave., Indianapolis, Ind.

KEEP OLD MAN WINTER ON THE RUN

XX TH CENTURY HEATING & VENTILATING CO.
AKRON, OHIO

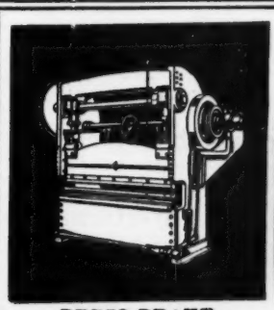
CHECK YOUR HEATING INSTALLATIONS
WITH THE
"ALNOR" VELOMETER

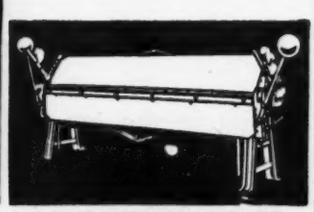
This all-purpose air velocity meter indicates air velocities directly and instantaneously on the scale in f.p.m. without the necessity of timing or mathematical calculations. Standard range 0-300, 0-3000 f.p.m. Other ranges available up to 18,000 f.p.m.

Write us today for a folder giving more complete information.

ILLINOIS TESTING LABORATORIES, INC.
412 N. LaSalle Street Chicago, Illinois

CHICAGO





PRESS BRAKE **HAND BENDING BRAKE**

Steel Brakes—Presses—Shears

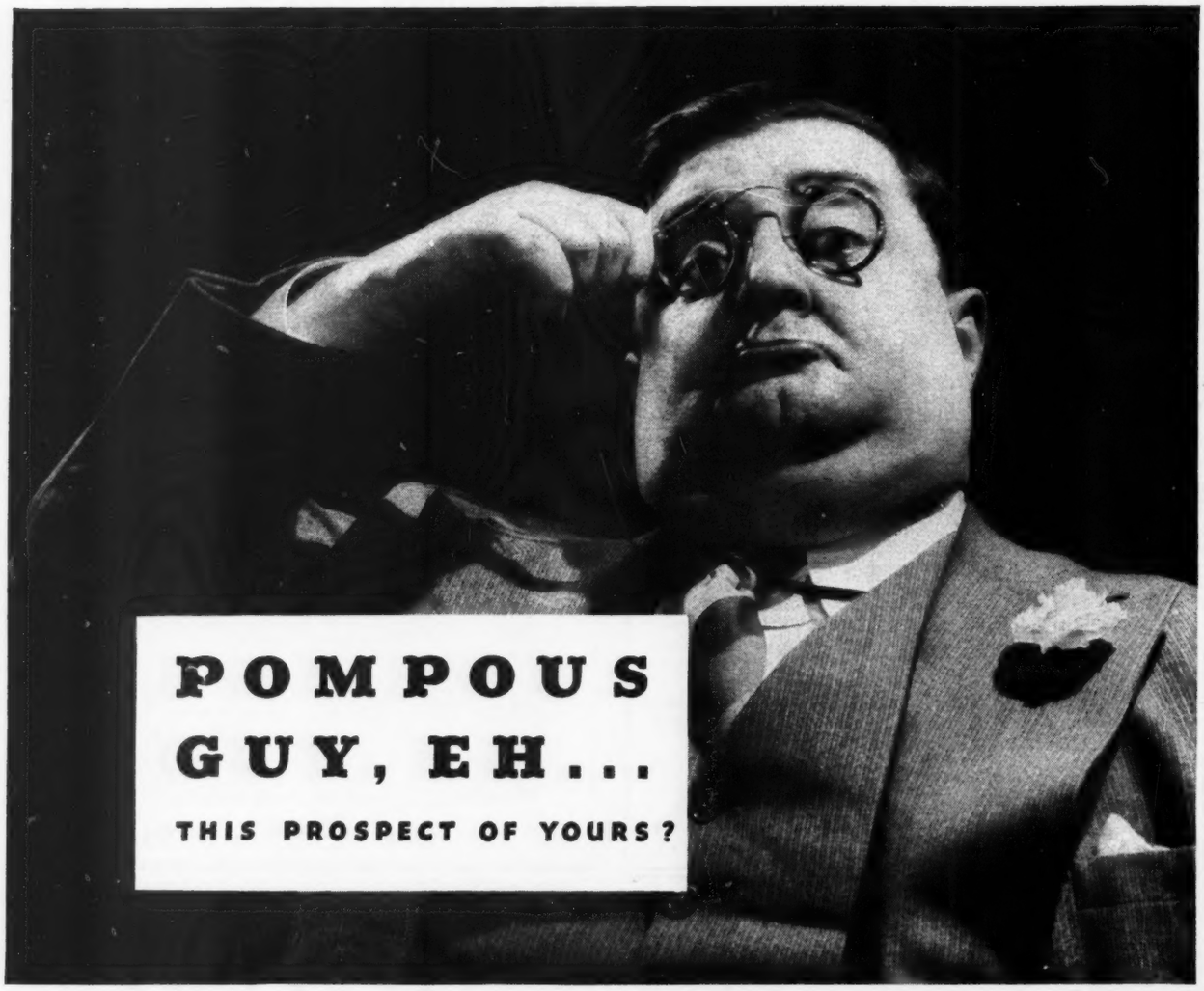
DREIS & KRUMP MFG. CO.
7404 LOOMIS BLVD. CHICAGO

AT THE CENTER OF THINGS

RATES FROM $3.00

CORONADO HOTEL
SPRING AT LINDELL
SAINT LOUIS MISSOURI
Preston J. Bradshaw, Director

FOUR FAMOUS RESTAURANTS



YOUR SALESMEN HAVE MET THIS TYPE OF BUYER TIME AND AGAIN. Though he's "regular" enough at heart, he has discovered that puffing himself up like a pouter pigeon and acting lofty does much to dampen a salesman's ardor. But when these "big shot" prospects of yours pick up American Artisan, they are with an old friend. No need then to be pompous. They hang up their defensive masks when they are on a common meeting ground with an editor who is their trusted consultant.

Your prospects look to American Artisan for money-making ideas . . . for news of the warm air heating, air conditioning and sheet metal contracting business. For this publication, business men pay thousands of dollars each year in subscription cash. That backlog of paid circulation, plus the extremely high editorial quality of American Artisan, is your guarantee of a sure way to help your salesmen get back of their prospects' masks of sales resistance.

If it's low-dollar coverage of warm air heating, air conditioning and sheet metal contracting you want, place American Artisan at the top of your advertising schedule.

Highest editorial standards and publishing integrity.

AMERICAN ARTISAN

bears the two hall-marks of known value

Proved reader interest in terms of paid circulation.

SERVICE SECTION: Rates—$5.00 per inch per insertion. One inch minimum. CLASSIFIED SECTION: 5 cents for each word including heading and address. Count seven words for keyed address. $1.00 minimum. Cash must accompany order.

AMERICAN ARTISAN Service Section

1/4" RIBBED WIRE GLASS

Shipments anywhere F.O.B. our warehouse.
13c per sq. ft. plus boxing.
Stock Sheets—Case lots.
Quotations on cut sizes on application.

T. J. ATCHESON GLASS CO.
955 MAIN STREET BUFFALO, N. Y.

CLEAN AIR ASSURES CLEAN INTERIORS

Smoked and sooty walls, ruined furnishings, soiled drapes are prevented by the use of Annis Air Filters in the forced draft heating system.
Thousands of beautiful homes are protected by this simple, inexpensive method.
Write for descriptive bulletins.

ANNIS AIR FILTERS
1515 Gardena Ave., Glendale, Calif.

CUT YOUR COSTS by Spot Welding

WITH ACE SPOT WELDERS

Cheaper, better and faster than riveting.

Built for production service. Engineered to meet practical requirements of sheet metal shops. Made in sizes from 5 K. W. up.

Only $90

for Series 62.
Welds 2 pcs. 16 Ga. Steel.
Send for free literature.

PIER EQUIPMENT MFG. CO.
Welding Equipment Division
727 Cross St., Benton Harbor, Michigan

BOOSTER FANS

Of all types and sizes for every purpose.
TIME TESTED AND PROVEN SUCCESSFUL

Regular Booster fan with attachment cord for 9" or larger pipe. $4.00 to Dealers.

Encased Booster fan, as illustrated, made in all pipe sizes from 6" to 12", with oil cups, and fitting for BX or conduit.

Register Booster fan for simplest installation. Simply place in register box.

Cold air return Booster fan to "pep" up any gravity system, new or old.

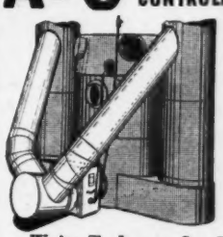
Three Speed Control box. Booster Fans may be run at high, medium or low speed, or turned "off" as desired. Beautifully finished in platinum grey crystal enamel.

Mercoid Control. We can now furnish a very high grade MERCOID SENSATHERM to automatically turn the BOOSTER FAN off or on as the room temperature requires. Operates on 110 Volt A. C. and is especially adapted for any model of our BOOSTER FANS since 1933.

WRITE FOR LITERATURE.

Brumme Manufacturing Company
314 So. Artesian Ave., Chicago, Illinois

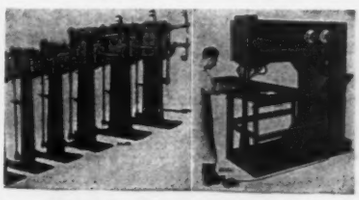
A-C THERMOSTATICALLY CONTROLLED AUTOMATIC HEAT BOOSTER



Everything the Home Owner wants in a Furnace Fan—At a price Every Furnace Owner Can Afford to Pay.

Write Today or See Your Jobber

A.-C. MANUFACTURING CO.
PONTIAC ILLINOIS



Electric welding equipment of every description to weld from a watch case to a door. Also special welding machines, spot, butt, seam, a. c. arc welders in sizes from 1/4 to 500 KVA. Ask for our catalog No. 38-WT. Also production job welding.

EISLER ENGINEERING CO., Inc.
761 S. 13th St. NEWARK, N. J.

SHAMBLEN SERVICE

is known throughout the trade. Your order filled when and how you want it and with parts that are guaranteed to fit.

Try us with your next repair job. Our service and repair parts cannot be excelled. No order too large, none too small. Write today for catalog and further particulars.

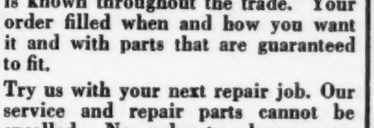
SHAMBLEN FURNACE PARTS COMPANY
231-39 First Avenue Pittsburgh, Pa.

BEVERLY THROATLESS SHEARS

are indispensable to the modern, up to date sheet metal shop. Light, portable, yet extremely strong, they will make your shearing operations much faster, neater and more economical thru time saved on the job. They are made in two sizes to handle up to 14 or 10 gauge metal and are very reasonably priced.

Write today for literature and prices.

BEVERLY SHEAR CO.
3009 W. 110TH PLACE, DEPT. 3, CHICAGO



"DO-ALL" Combination Electric Hammer & Drill

drills both concrete and metal. Cap. 1 1/16" in concrete—3/8" in metal. Saves time and money in setting expansion bolts, anchors and plugs. Soon pays for itself. Easy to maintain. Bulletin 381. Wodack Electric Tool Corporation, 4844 W. Huron St., Chicago, Ill.

A REAL TIME and MONEY SAVER

Modernaire Heat Rule is designed for simplifying the engineering of forced air and gravity heating installations. Nothing complicated, easy to use, exact and can be used anywhere. Removes guess work. Write today for yours. Only $1.00, complete with instructions and data sheets.

MODERNAIRE ENGINEERING COMPANY
107 S. W. 2nd AVE., DES MOINES, IA.

A REAL WELDER

"JUST MADE FOR YOU"

$10.00 Extra for Water-Cooled Electrodes

NEW IDEAL SPOT WELDER
Floor Type
7½ K.W. (10 KVA) 18" arms, 2 pieces 14 ga. $150.00
10 K.W. (13 KVA) 24" arms, 2 pieces ⅛" $185.00

Here is YOUR opportunity to buy a New Spot Welder at a Used Price. Immediate stock shipment, subject to prior sale.

INTERSTATE Machinery Co., Inc.
107 S. Clinton St., Chicago (Free Parking)

Classified

SITUATIONS OPEN

SALESMEN WANTED—One of the largest and oldest manufacturers in the heating and air conditioning industry has openings for experienced, aggressive salesmen in the following territories: 1. Southwestern States; 2. Midwestern States; 3. Atlantic Seaboard. Complete line of nationally advertised coal, oil and gas-fired equipment, also registers, grilles, prefabricated and gravity furnace pipe and fittings. Warehouse stocks adjacent to Midwestern and Atlantic Seaboard territories. Give complete information in first letter, including previous experience, sales record, references and acquaintance with heating trade. Include recent snap-shot photo, if available. Address Key No. 444, American Artisan, 6 No. Michigan Ave., Chicago, Ill.

HEATING SALESMAN WANTED—We have openings for five thoroughly experienced heating salesmen. Do not apply unless your experience covers calculating heat losses, laying out forced air heating systems, servicing coal, oil and gas fired units. Address The Rudy Furnace Company, Dowagiac, Mich.

FOR SALE

Live warm-air heating and sheet metal business in excellent location. Low rent, shop includes modern tools. Bad health only reason for selling. Address key No. 448, American Artisan, 6 N. Michigan Ave., Chicago, Ill.

FOR SALE reasonable well established roofing and sheet metal business. Best business town in Texas of size, population 15,000, oil center. Reason for selling sickness. Address Key No. 446, American Artisan, 6 N. Michigan Ave., Chicago, Ill.

SITUATIONS WANTED

Sheet Metal Worker, 30, forced air, general work, read blueprint, layout. Address Key No. 447, American Artisan, 6 N. Michigan Ave., Chicago, Ill.

Experienced Warm Air Furnace Salesman with an established dealer trade in Mid-West States, will consider Manufacturers proposition with up-to-date medium priced line preferably with Jobber connections. Capable and Trustworthy. Address Key No. 450, American Artisan, 6 N. Michigan Ave., Chicago, Ill.

MISCELLANEOUS

Sales Engineer Wants: Warm Air Heating and Air-Conditioning equipment, to sell Jobbers, Dealers on commission, Experienced, Reliable, Successful, West Central States. Address Key No. 449, American Artisan, 6 N. Michigan Ave., Chicago, Ill.

Index to Advertisers

Firms represented in this issue are identified by the folio of the page on which their advertising appears. Advertising which appears in other issues is marked with an asterisk.

☆ ☆ ☆

A. C. Mfg. Co. 101
Accurate Mfg. Works ..... *
Acme Electric Welder Co. 94
Advance Appliance Co. 81
Aerofin Corp. ..... *
Air Conditioning Products Co. ..... *
Air Controls, Inc. 77
Aldrich Co. ..... *
Allen Corp. ..... *
American Air Filter Co., Inc. 72
American Brass Co. 73
American Rolling Mill Co., The 71
American Warming & Ventilating Co. *
Anemostat Corp. of America 91
Annis Air Filters 101
Anthracite Industries, Inc. 6
Armstrong Co., The 89
Atcheson Glass Co., T. J. 101
Auer Register Co. 75
Automatic Humidifier Co. 89

Barber-Colman Co. 57
Barber Gas Burner Co., The 8
Bead Chain Mfg. Co. ..... *
Berger Bros. Co. 97
Beverly Shear Co. 101
Brauer Supply Co., A. G. 96
Bremil Mfg. Co. 97
Binkley Mfg. Co. ..... *
Breuer Electric Mfg. Co. 94
Brumme Mfg. Co. 101
Buffalo Forge Co. 3
Burt Mfg. Co. 93

Capitol Furnace & Stove Repair Co. 93
Central Furnace & Stove Repair Co. ..... *
Century Electric Co. 15
Century Engineering Corp. 94
Chalmers Oil Burner Co. 97
Chandler Co. ..... *
Clarage Fan Co. 88
Climatemaker Corp. of Tennessee 98
Cook Electric Co. 79
Coronado Hotel 99
Crescent Tool Co. 9
Curtis Refrigerating Machine Co. 78

Dail Steel Products Co. ..... *
Detroit Lubricator Co. 11
Dreis & Krump Mfg. Co. 99

Eisler Engineering Co. 101
Electric Vacuum Cleaner Co., Inc. ..... *
Elgo Shutter & Mfg. Co. 97

Farrell-Cheek Steel Co. ..... *
Fitzgibbons Boiler Co., Inc. ..... *
Friez & Sons, Julien P. 85

General Electric Co. ..... *
Gleason-Avery, Inc. ..... *
Goese Mfg. Co. 98
Grand Rapids Furnace Cleaner Co. 97
Graphic Arts Photo Service ..... *
Gray, G. L. ..... *

Harrington & King Perforating Co. 93
Hart & Cooley Mfg. Co. 79
Henry Furnace & Foundry Co., The 85
Hess Warming & Ventilating Co. 91
Hussey & Co., C. G. ..... *

Illinois Testing Lab., Inc. 99
Independent Register Co., The 96
International Nickel Co., Inc. 5
Interstate Machinery Co. 101

Johnson Gas Appliance Co. 97

Kent Co., The ..... *
Kol-Master Corp. 93

Lamneck Products, Inc. ..... Inside Front Cover
Lau Blower Co. 80
Libert Machine Co. ..... *
Lincoln Electric Co. 74
Lochinvar Corp. 88
Lohman, Inc., Wm. J. 91
Lyon-Conklin & Co. 96

Maid-O'-Mist, Inc. ..... *
Maurey Mfg. Co. 95
Meyer & Bro. Co., F. ..... *
Meyer Furnace Co. ..... *
Michigan Tank & Furnace Co. ..... *
Milcor Steel Co. ..... *
Minneapolis-Honeywell Regulator Co. ..... Outside Back Cover
Modernaire Engrg. Co. 101
Monmouth Products Co. 13
Morency-Van Buren Div., Scovill Mfg. Co. 84

Niagara Machine & Tool Works. 75
Northwestern Stove Co. ..... *

Osborn Co., J. M. & L. A. 10
Owens-Corning Fiberglas Co. 7

Pacific Gas Radiator Co. 87
Peerless Electric Co. 91
Peerless Foundry Co. 99
Peninsular Stove Co. ..... *
Penn Electric Switch Co. ..... *
Perfect Burner Co. ..... *
Perfection Stove Co. 97
Pier Equipment Mfg. Co. 101
Practical Instrument Co. ..... *
Premier Division, Electric Vacuum Cleaner Co., Inc. ..... *
Premier Furnace Co. ..... *
Pyrolite Products Co. 94

Randall Graphite Products Corp. 87
Register & Grille Mfg. Co. 99
Republic Steel Corp. 16
Rock Island Register Co. ..... *
Rybolt Heater Co. 82
Ryerson & Son, Inc., Joseph T. 99

St. Louis Furnace Mfg. Co. 92
Sall Mountain Co. 77
Schaefer Brush Mfg. Co. ..... *
Schwitzer-Cummins Co. ..... *
Scovill Mfg. Co. 84
Shamblen Furnace Parts Co. 101
Skilsaw, Inc. ..... *
Skuttle Humidifier Co., J. L. 80
Superior Sheet Steel Co. 36
Swartwout Co., The 82

Thomson-Gibb Electric Welding Co. 89
Trane Co., The ..... *
Tuttle & Bailey, Inc. 86
Twentieth Century Heating & Ventilating Co. 99

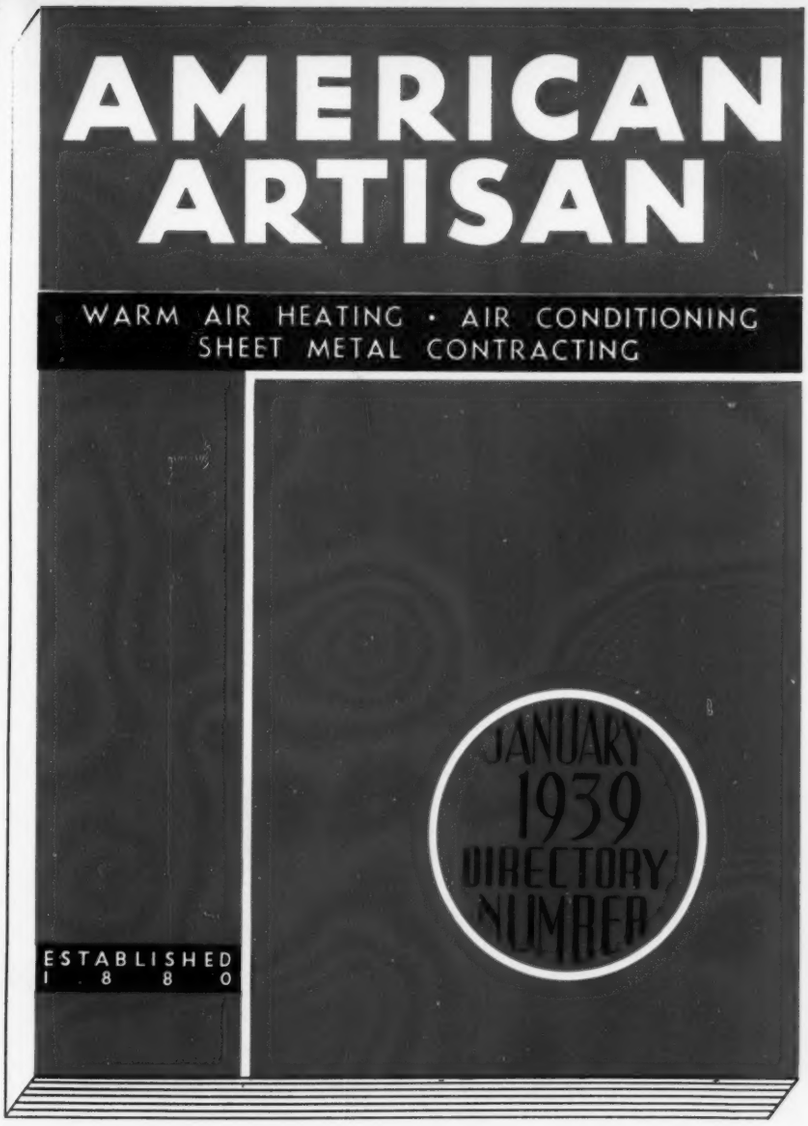
U. S. Air Conditioning Corp. 93
U. S. Register Co. 14
U. S. Steel Corp. 12
Utility Fan Corp. 83

Victor Elec. Products, Inc. 95

Ward Machinery Co. 95
Waterloo Register Co. 90
White Mfg. Co. 76
Whitney Mfg. Co., W. A. 92
Whitney Metal Tool Co. 89
Williams-Wallace Co. 90
Wilson, Inc., Grant ..... *
Wise Furnace Co. ..... *
Wiss & Sons Co., J. 99
Wodack Elec. Tool Corp. 101

XXth Century Heating & Ventilating Co. 99

Youngstown Sheet & Tube Co. 58



NEXT ISSUE is IT...

The JANUARY 1939 ANNUAL DIRECTORY NUMBER

IT'LL BE OUT next month! AMERICAN ARTISAN'S Seventh Annual Directory Number carrying the industry's original, reliable, complete classifications of "who makes it" and "where are they located?" It's a real advertising buy for every manufacturer. It offers advertising that lives ALL YEAR. A chance to reach the ARTISAN'S 8,200 readers and BUYERS with a message that packs a full-year advertising campaign wallop . . . AND AT THE REGULAR ISSUE RATES!

The smart manufacturer can take advantage of this outstanding service by making a full showing of all products in large space without paying a premium. It's nothing to overlook! 8,200 key dealers, contractors, engineers, wholesalers and manufacturers aren't so easily available in any other way.

An early order will assure you of a good position . . . and you'd better hurry, because time is short!

READERS

The 1939 edition of AMERICAN ARTISAN'S Annual Directory Number will be the most complete and convenient guide you have yet had to manufacturers of warm-air heating, air-conditioning and sheet metal equipment. Its listing of manufacturers' addresses, trade names and products will be unsurpassed, and all listings are carefully indexed and cross indexed for the speediest possible reference. It will come to you in a strong cardboard package bound in a special heavy cover to withstand the wear and tear of constant reference to it throughout the year. WATCH FOR IT!

CLOSING DATES

We request that copy for this issue be forwarded to us as far in advance as possible. Color, cover and insert forms close December 20th. . . . Black and white forms close December 27th. By getting your copy to us early, you'll help us to put it through without too much rush, and assure yourself of advance proofs and favorable position.

It's Original and Authoritative . . .
Send us your Reservation TODAY!

AMERICAN ARTISAN

6 North Michigan Avenue **Chicago, Ill.**

AUTOMATIC CONTROLS MH

DEPENDABLE CONTROLS COST LESS THAN SERVICE

COMPLETE AUTOMATIC CONTROL

MINNEAPOLIS-HONEYWELL

Cinch sales with dependability!

CHRONOTHERM

■

PROTECTORELAY

Install

COMPLETE CONTROLS

Insure complete satisfaction with a complete control system. Limit controls provide a full measure of safety by preventing excessive boiler or furnace temperatures beyond the thermostat's control.

AIRSTAT

AQUASTAT

PRESSURETROL

WATER CIRCULATOR

HERE'S a cinch way to cinch automatic heating sales. The statement, "We standardize on Minneapolis-Honeywell Controls" is a powerful sales argument. Your customers recognize the advantages of the performance, safety and dependability of M-H Controls and this gives you an excellent sales weapon.

The M-H Chronotherm is without question the finest thermostat on the market. In addition to the exclusive M-H Heat acceleration feature, which enables it to sense temperature requirements before they are apparent, the Chronotherm automatically lowers the temperature to a fuel saving level at night and automatically restores it in the morning, at predetermined times. Heat acceleration is to be found only with Minneapolis-Honeywell and is made possible by the Series 10 Circuit – another exclusive M-H feature.

Minneapolis-Honeywell Controls will help you cinch sales. Take advantage of their reputation.

MINNEAPOLIS-HONEYWELL REGULATOR CO.

2726 FOURTH AVENUE SOUTH • MINNEAPOLIS, MINNESOTA